U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

OFFICE OF NUCLEAR REACTOR REGULATION

2.4.4 POTENTIAL DAM FAILURES

REVIEW RESPONSIBILITIES

Primary - ~~Hydrologic and Geotechnical Engineering Branch (HGEB)~~ Civil Engineering and Geosciences Branch (ECGB)[1]

Secondary - None

I. AREAS OF REVIEW

In this section of the safety analysis report (SAR) the hydrogeologic design basis is developed to ~~assure~~ ensure[2] consideration in plant design of any potential hazard to the safety-related facilities due to the failure of upstream and downstream water control structures. The areas of review include consideration of flood waves (bores) from severe breaching of upstream dams and the potential loss of water supply due to failure of a downstream dam, domino-type failures of dams, landslides, and effects of sediment deposition and erosion.

When data are provided to show that seismic events will not cause failures of upstream dams that could produce the governing flood at the plant, this section may contain additional data and other information to support a contention that the dams are equivalent to seismic Category I structures and will survive a local equivalent of the safe shutdown earthquake (SSE) or will survive the operating basis earthquake (OBE).[3] In such cases, the ~~Geotechnical Engineering Section (GES) of HGEB, the Geosciences Branch (GB), and Structural Engineering Branch (SEB), as necessary,~~ ECGB[4] will evaluate the data necessary to justify such a classification. ~~GES, GB, and SEB~~ ECGB[5] review procedures are outlined in the appropriate geosciences and structural ~~SRP~~ Standard Review Plan (SRP)[6] sections. The balance of this SRP section applies to the hydrologic analyses of dam failures or breaches.

USNRC STANDARD REVIEW PLAN

Standard review plans are prepared for the guidance of the Office of Nuclear Reactor Regulation staff responsible for the review of applications to construct and operate nuclear power plants. These documents are made available to the public as part of the Commission's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Standard review plans are not substitutes for regulatory guides or the Commission's regulations and compliance with them is not required. The standard review plan sections are keyed to the Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants. Not all sections of the Standard Format have a corresponding review plan.

Published standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555.

Where analyses are provided in support of either a conclusion that a probable maximum flood (PMF) should be the design basis flood for a stream, or that a postulated or arbitrarily assumed dam failure flood is the design basis flood for a stream, the areas of review consist of the following:

1. Conservatism of modes of assumed dam failure and deposition of debris downstream.

2. Consideration of flood control reservoirs at full pool level.

3. Conservatism of coincident flow rates and levels, depending on whether failure is postulated with an equivalent SSE coincident with a 25-year flood or an OBE[7] coincident with a standard project flood (SPF). An SPF is considered to be about forty percent of a PMF.

4. Flood wave attenuation to downstream dams or to the site, whichever would be encountered first.

5. Potential for multiple dam failures; flood wave effects and potential for failure of downstream dams.

6. Hydraulic failure as a result of overtopping for any reason.

7. Dynamic effects of possible bores on exposed plant facilities.

8. Conservative flow conditions for downstream dam failures that can influence safety-related water supplies.

9. Applicability and conservatism of models used to predict the effects of dam failure floods including breach shape and rate of failure.

II. ACCEPTANCE CRITERIA

Acceptance criteria for this SRP section are based on meeting the requirements of the following regulations:

1. General Design Criterion 2 (GDC 2) as it relates to structures, systems, and components important to safety being designed to withstand floods.

2. 10 CFR Part 100 as it relates to evaluating hydrologic features of the site.

3. 10 CFR Part 100, Appendix A, as it relates to establishing the design basis flood due to seismic dam failure.

To meet the requirements of GDC 2; 10 CFR Part 100; and 10 CFR Part 100, Appendix A, as they relate to dam failures, the following specific criteria are used:

The staff will review the applicant's analyses and independently assess the coincident river flows at the site and at the dams being analyzed. ANSI N170[8] provides guidance on acceptable river flow conditions to be assumed coincident with the dam failure event. The applicant's estimates (which may include landslide-induced failures) of the flood discharge resulting from the coincident events should be no more than 5% less conservative than the staff's estimates to be acceptable. If the applicant's estimates differ by more than 5%, the applicant should fully document and justify its estimates or accept the staff's estimates and redesign applicable flood protection.

For SAR Section 2.4.4.1 (Dam Failure Permutations): The location of dams and potentially "likely" or severe modes of failure must be identified. The potential for multiple, seismically induced dam failures and the domino failure of a series of dams must be discussed. Approved models of the Corps of Engineers and the Tennessee Valley Authority are used to predict the downstream water levels resulting from a dam breach (Refs. ~~7, 11, 16, 17 and 18~~ 8, 12, 17, 18, and 19).[9] First-time use of other models will require complete model description and documentation. Acceptance of the model (and subsequent analyses) is based on the staff review of model theory, available verification, and application. Where other than instantaneous failure is assumed, the conservatism of the rate of failure and shape of the breach should be well documented. A determination of the peak flow rate and water level at the site for the worst possible combination of dam failures and a summary analysis (that substantiates the condition as the critical permutation) must be presented, along with a description (and the bases) of all coefficients and methods used. Also, the effects of other concurrent events on plant safety, such as blockage of the river and water-borne missiles, must be considered.

For SAR Sections 2.4.4.2 (Unsteady Flow Analysis of Potential Dam Failures) and 2.4.4.3 (Water Level at Plant Site): The effects of coincident and antecedent flood flows (or low flows for downstream structures) on initial pool levels must be considered. Use of the methods given in References ~~4 or 6~~ 5 or 7 is acceptable for determination of initial pool levels. Depending upon estimated failure modes and the elevation difference between plant grade and normal river levels, it may be acceptable to use conservative simplified procedures to estimate flood levels at the site. Where calculated flood levels using simplified methods are at or above plant grade and using assumptions which cannot be demonstrated as conservative, it will be necessary to use unsteady flow methods to develop flood levels at the site. References ~~11 and 12~~ 12 and 13 are acceptable methods; however, other programs would be acceptable with proper documentation and justification. Computations, coefficients, and methods used to establish the water level at the site for the most critical dam failures must be summarized. Coincident wind-generated wave activity should be considered in a manner similar to that discussed in SRP Section 2.4.3.

Appropriate sections of the guides described below are used by the staff to determine the acceptability of the applicant's data and analyses. Regulatory Guide 1.59,[10] which incorporates ANSI N170,[11] provides guidance for estimating the design basis for flooding considering the worst single phenomenon and combination of less severe phenomena. Regulatory Guide 1.29 identifies the safety-related structures, systems, and components, and Regulatory Guide 1.102 describes acceptable flood protection to prevent the safety-related facilities from being adversely affected.

Technical Rationale[12]

The technical rationale for application of acceptance criteria to reviewing potential dam failures with a potential to affect a nuclear power plant site is discussed in the following paragraphs:[13]

1. Compliance with GDC 2 requires that nuclear power plant structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as earthquake, tornado, hurricane, flood, tsunami, and seiche without loss of capability to perform their safety functions. The criterion further specifies that the design bases for these structures, systems, and components shall reflect the following:

   a. Appropriate consideration of the most severe natural phenomena historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and time period in which the historical data have been accumulated;

   b. Appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena; and

   c. The importance of the safety functions to be performed.

   This criterion is applicable to SRP Section 2.4.4 because it specifies the hydrologic phenomenon (i.e., flooding associated with dam failure) addressed in this section. In general terms, it also specifies the level of conservatism that must be used to assess the severity of the flood for the purpose of determining the design bases for structures, systems, and components important to safety.

   Meeting the requirements of GDC 2 provides a level of assurance that structures, systems, and components important to safety have been designed to withstand the most severe flood resulting from dam failure likely to occur.[14]

2. Section 100.10(c) of 10 CFR Part 100 requires that the site's physical characteristics (including seismology, meteorology, geology, and hydrology) be taken into account when determining its acceptability for a nuclear power reactor.

   10 CFR Part 100 is applicable to SRP Section 2.4.4 because it addresses the physical characteristics, including hydrology, considered by the Commission when determining the acceptability of a site for a power reactor. To satisfy the hydrologic requirements of 10 CFR Part 100, the applicant's SAR must contain a description of the hydrologic characteristics of the region and an analysis of potential dam failures. The description must be sufficient to assess the acceptability of the site and the potential for those characteristics to influence the design of structures, systems, and components important to safety.

   Meeting this requirement provides a level of assurance that structures, systems, and components important to safety have been designed to withstand the effects of high water levels resulting from failure of upstream dams, as well as those of low water levels resulting from failure of a downstream dam.[15]

3. Appendix A to 10 CFR Part 100 requires that geologic and seismic factors include a determination of site suitability and acceptability of the nuclear power plant design. Paragraph IV(c) describes the investigation required to obtain geologic and seismic data for evaluating seismically induced floods, including failure of an upstream dam during an earthquake.

Appendix A is applicable to SRP Section 2.4.4 because it requires investigation of seismically induced floods or low water levels that guide the Commission in its consideration of the suitability of proposed sites for nuclear power plants. More detailed guidance on the investigation of seismically induced floods is provided Regulatory Guide 1.70, including results for seismically induced dam failures and antecedent flood flows coincident with the flood peak.

Meeting this requirement provides a level of assurance that structures, systems, and components important to safety have been designed to withstand the effects of seismically induced failure of upstream or downstream dams.[16]

III. REVIEW PROCEDURES

The conservatism of the applicant's estimates of flood potential and low water levels from structure failures is judged against the criteria indicated in subsection II above. An analysis is performed using simplified, conservative procedures (such an instantaneous failure, coincident SPF flows, minimal flood wave attenuation, and extrapolated site discharge-rating curves). Techniques for such analyses are identified in standard hydraulic design references and text books, such as those listed in the reference section. If no potential flood problem exists, the staff safety evaluation report (SER) input is written accordingly. If the simplified analysis indicates a potential flooding problem, the analysis is repeated using a more refined technique which may include time rate of failure and hydrometeorologically compatible storm centering. Detailed failure models, such as those of the Corps of Engineers and the Tennessee Valley Authority, are utilized to identify the outflows from various failure modes. Models of the Corps of Engineers or the Tennessee Valley Authority are used to identify the outflow characteristics and resultant water level at the site (Refs. ~~7, 11, 12, 16, 17, and 18~~ 8, 12, 13, 17, 18, and 19). The staff will develop a position based on the analyses performed; resolve, if possible, differences between the applicant's and staff's estimates; and write the SER input accordingly.

The above reviews are performed only when applicable to the site or site region. Some items of review may be done on a generic basis.

For standard design certification reviews under 10 CFR Part 52, the procedures above should be followed, as modified by the procedures in SRP Section 14.3 (proposed), to verify that the design set forth in the standard safety analysis report, including inspections, tests, analysis, and acceptance criteria (ITAAC), site interface requirements and combined license action items, meet the acceptance criteria given in subsection II. SRP Section 14.3 (proposed) contains procedures for the review of certified design material (CDM) for the standard design, including the site parameters, interface criteria, and ITAAC.[17]

IV. EVALUATION FINDINGS

For construction permit (CP) and early site permit[18] reviews, the findings will summarize the applicant and staff evaluations in compliance with GDC 2; 10 CFR Part 100; and 10 CFR Part 100, Appendix A, of the design basis maximum and minimum water levels caused by potential dam failures. If the applicant's estimates are within acceptable margins (described in subsection II), staff concurrence in the applicant's estimates will be stated. If the applicant's estimates are not within acceptable margins, and if the plant may be adversely affected, a position requiring use of the staff bases will be stated. If no dam failure review was undertaken at the construction permit stage (of the scope described), this fact will be indicated.

For operating license (OL) or combined license (COL) reviews of cases for which detailed potential dam failure analyses were made during the CP or early site permit review, the ~~CP-stage~~ earlier[19] conclusions will be referenced. In addition, any further review done to reaffirm the maximum or minimum water levels based on any new information will be described and the results and conclusions stated.

Sample statements for reviews follow:

> The staff concludes that the plant design flood elevation, at plant grade of ~~50 feet~~ 15 m (50 ft)[20] above mean sea level (MSL), is acceptable and meets the requirements of General Design Criterion 2; 10 CFR Part 100; and 10 CFR Part 100, Appendix A, with respect to potential hazards due to dam failure floods. This conclusion is based on the following evaluation.
>
> The distance (more than ~~300 miles~~ 480 km (300 mi))[21] to upstream reservoirs of appreciable size is such that the staff assessment leads to the conclusion that their arbitrarily assumed failure, under postulated combinations of floods and earthquakes of the severity discussed in Regulatory Guide 1.59, would not constitute a threat to the plant.
>
> Dam failure-caused "worst case" floods were evaluated by the applicant based upon failures with consideration of only the location and sizes of upstream impoundments, and not on inherent capability of such structures to resist earthquakes, volcanic activity, and severe landslide-induced floods. The most severe flood of this kind was estimated based upon an assumed catastrophic failure of Dam A some ~~420 miles~~ 680 km (420 mi)[22] upstream. The peak flow at the site from such a flood was estimated to be ~~3,000,000 cfs~~ 85,000 m^3/s (3,000,000 cfs).[23] This flow is estimated to occur about 2 days after the dam failure and reach elevation ~~41 feet~~ 12-m (41-ft)[24] MSL, ~~9 feet~~ 3 m (9 ft)[25] below plant grade.
>
> A volcanically induced flood was assumed to cause a domino-type failure of the three dams on the tributary B River from a volcanic eruption of Mt. D. The evaluation indicated such an event could cause the second most severe artificial flood that would reach the site. This event was estimated to produce a peak flow at the site of ~~2,800,000 cfs~~ 80,000 m^3/s (2,800,000 cfs)[26] and a water level of ~~39 feet~~ 12-km (39-ft)[27] MSL, ~~11 feet~~ 3 m (11 ft)[28] below plant grade.

The findings will address the envelope of site-related hydrologic parameters. These parameters should be representative of the most severe hydrologic characteristics likely to occur as a result of dam failure.[29]

For design certification reviews, the findings will also summarize, to the extent that the review is not discussed in other safety evaluation report sections, the staff's evaluation of inspections, tests, analyses, and acceptance criteria (ITAAC), including design acceptance criteria (DAC), site interface requirements, and combined license action items that are relevant to this SRP section.[30]

V. IMPLEMENTATION

The following is intended to provide guidance to applicants and licensees regarding the NRC staff's plans for using this SRP section.

This SRP section will be used by the staff when performing safety evaluations of license applications submitted by applicants pursuant to 10 CFR 50 or 10 CFR 52.[31] Except in those cases in which the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the method described herein will be used by the staff in its evaluation of conformance with Commission regulations.

The provisions of this SRP section apply to reviews of applications docketed six months or more after the date of issuance of this SRP section.[32]

Implementation schedules for conformance to parts of the method discussed herein are contained in the referenced regulatory guides.

VI. REFERENCES

1. 10 CFR Part 50, Appendix A, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena."

2. 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."[33]

3. 10 CFR Part 100, "Reactor Site Criteria."

4. 10 CFR Part 100, Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants."

5. "Flood Hydrograph Package," HEC-1, Corps of Engineers Hydrologic Engineering Center, Davis, California, October 1970.

6. "Water Surface Profiles," HEC-2, Corps of Engineers Hydrologic Engineering Center, Davis, California, February 1972.

7. "Reservoir System Operation for Flood Control," HEC-5, Corps of Engineers Hydrologic Engineering Center, Davis, California, May 1973.

8. "Routing of Floods Through River Channels," EM 1110-2-1408, Corps of Engineers, March 1960.

9. Hunter Rouse, ed., "Engineering Hydraulics," John Wiley & Sons, Inc., New York (1950).

10. Ven Te Chow, "Open-Channel Hydraulics," McGraw-Hill Book Co., New York(1959)

11. Ven Te Chow, ed., "Handbook of Applied Hydrology," McGraw-Hill Book Co., New York (1964).

12. J. M. Garrison, J. P. Granju, and J. T. Price, "Unsteady Flow Simulation in Rivers and Reservoirs," Jour. Hydraulics Division, Proc. Am. Soc. of Civil Engineers, Vol. 95, No. HY5, pp. 1559-1576 (1969).

13. "Gradually Varied Unsteady Flow Profiles," 723-62-L2450, Corps of Engineers Hydrologic Engineering Center, Davis, California, March 1969.

14. R. A. Baltzer and C. Lai, "Computer Simulation of Unsteady Flows in Waterways," Hydraulics Division, Proc. Am. Soc. of Civil Engineers, Vol. 94, No. HY4, pp. 1083-1117 (1968).

15. J. J. Stoker, "Numerical Solution of Flood Prediction and River Regulation Problems," Reports I and II, New York Univ. (1953-54).

16. V. L. Streeter and E. B. Wylie, "Hydraulic Transients," McGraw Hill Book Co., New York, pp. 239-259 (1967).

17. W. A. Thomas, "A Method for Analyzing Effects of Dam Failures in Design Studies," Corps of Engineers Hydrologic Engineering Center, Davis California (for presentation at the ASCE Hydraulics Division Specialty Conference, Cornell University, August 1972).

18. "Flow Through a Breached Dam," Military Hydrology Bulletin No. 9, Corps of Engineers (1957).

19. "Floods Resulting From Suddenly Breached Dams, Conditions of High Resistance," Misc. Paper No. 2-374, Report 2, Corps of Engineers (1961).

10. Bureau of Reclamation, "Flood Routing," Chapter 6/0 in "Flood Hydrology,"Part 6 in "Water Studies," Volume IV, U.S. Department of the Interior (1947).

21. Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants."

22. Regulatory Guide 1.59, "Flood Design Basis for Nuclear Power Plants."

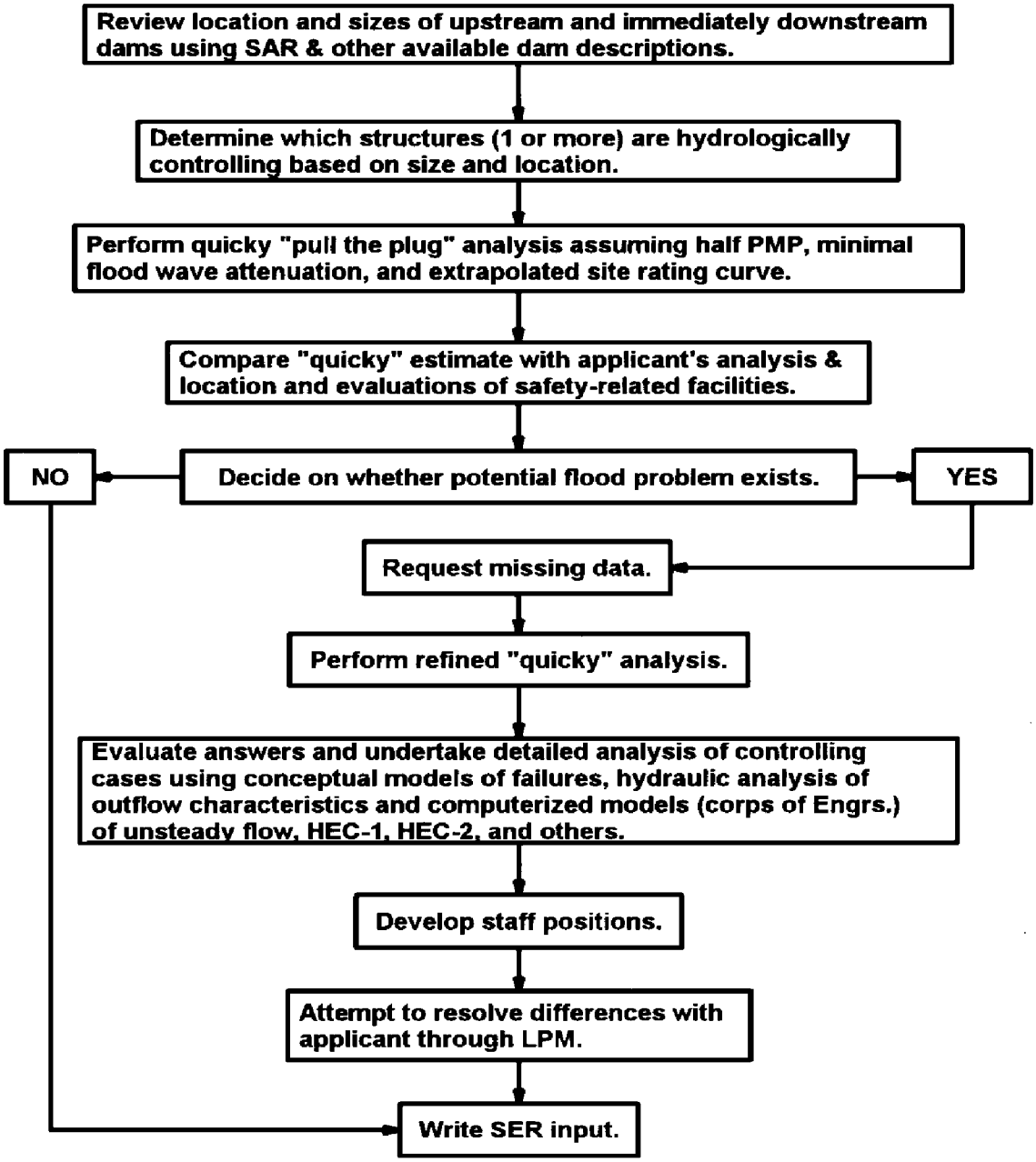
23. ANSI N170-1976[34], "Standards for Determining Design Basis Flooding at Power Reactor Sites."[35]

24. Regulatory Guide 1.29, "Seismic Design Classification."

25. Regulatory Guide 1.102, "Flood Protection for Nuclear Power Plants."

Figure 2.4.4-1

Standard Review Plan Section 2.4.4
Seismically - Induced Floods



SRP Draft Section 2.4.4
Attachment A - Proposed Changes in Order of Occurrence

Item numbers in the following table correspond to superscript numbers in the redline/strikeout copy of the draft SRP section.

Item	Source	Description
1.	Current PRB name and abbreviation	Changed PRB to Civil Engineering and Geosciences Branch (ECGB).
2.	Editorial correction	Changed "assure" to "ensure."
3.	Integrated Impact 1341	The Commission has approved specific staff positions and criteria for elimination of the OBE (see Section 1.M of SECY 93-087 and the associated SRM). The coincident OBE and standard project flood addressed in this subsection should be eliminated or replaced with an appropriate combination of flood and seismic event, depending on a staff assessment of the matter.
4.	Current ECGB review responsibility	Changed to describe an ECGB responsibility that had previously been shared between three branches.
5.	Current ECGB review responsibility	Changed to describe an ECGB responsibility that had previously been shared between three branches.
6.	Editorial	Defined "SRP" as "Standard Review Plan."
7.	Integrated Impact 1341	The Commission has approved specific staff positions and criteria for elimination of the OBE (see Section 1.M of SECY 93-087 and the associated SRM). The coincident OBE and standard project flood addressed in this subsection should be eliminated or replaced with an appropriate combination of flood and seismic event, depending upon a staff assessment of the matter.

Item	Source	Description
8.	Update Code or Standard	ANSI N170-1976 was revised in 1981 to ANSI/ANS-2.8, which in turn was revised in 1992. This reference should be updated to ANSI/ANS-2.8-1992 if a detailed comparison of the two versions supports the adoption of the more recent standard.
9.	Editorial	Reference numbers changed to accommodate new Reference 2 (global change for this section).
10.	Update Code or Standard	Regulatory Guide 1.59 references ANSI N170-1976, which was revised in 1981 to ANSI/ANS-2.8, which in turn was revised in 1992. RG 1.59 should be updated to reference ANSI/ANS-2.8-1992 if a detailed comparison of the two versions supports the update of the citation.
11.	Update Code or Standard	ANSI N170-1976 was revised in 1981 to ANSI/ANS-2.8, which in turn was revised in 1992. This reference should be updated to ANSI/ANS-2.8-1992 if a detailed comparison of the two versions supports the adoption of the more recent standard.
12.	SRP-UDP format item/ Develop technical rationale	"Technical Rationale" added to ACCEPTANCE CRITERIA and presented in paragraph form to describe bases for referencing the GDC.
13.	SRP-UDP format item/ Develop technical rationale	Added lead-in sentence for "Technical Rationale."
14.	SRP-UDP format item/ Develop technical rationale	Added technical rationale for GDC 2.
15.	SRP-UDP format item/ Develop technical rationale	Added technical rationale for 10 CFR Part 100.

Item	Source	Description
16.	SRP-UDP format item/ Develop technical rationale	Added technical rationale for Appendix A to 10 CFR Part 100.
17.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard paragraph to address application of Review Procedures in design certification reviews.
18.	SRP-UDP format item	Added reference to early site permit reviews.
19.	SRP-UDP format item	Added combined license (COL) that references an early site permit review.
20.	Conversion to SI units	Converted 50 ft to 15 m.
21.	Conversion to SI units	Converted 300 mi to 480 km.
22.	Conversion to SI units	Converted 420 mi to 680 km.
23.	Conversion to SI units	Converted 3,000,000 cfs to 85,000 m^3/s.
24.	Conversion to SI units	Converted 41 ft to 12 m.
25.	Conversion to SI units	Converted 9 ft to 3 m.
26.	Conversion to SI units	Converted 2,800,000 cfs to 80,000 m^3/s.
27.	Conversion to SI units	Converted 39 ft to 12 m.
28.	Conversion to SI units	Converted 11 ft to 3 m.
29.	SRP-UDP format item	Added paragraph to identify scope of design certification.
30.	SRP-UDP Format Item, Implement 10 CFR 52 Related Changes	To address design certification reviews a new paragraph was added to the end of the Evaluation Findings. This paragraph addresses design certification specific items including ITAAC, DAC, site interface requirements, and combined license action items.
31.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard sentence to address application of the SRP section to reviews of applications filed under 10 CFR Part 52, as well as Part 50.

Item	Source	Description
32.	SRP-UDP Guidance	Added standard paragraph to indicate applicability of this section to reviews of future applications.
33.	SRP-UDP format item	Added reference to 10 CFR Part 52.
34.	**Integrated Impact 1466**	Added applicable version date to the reference for ANSI N170.
35.	Update Code or Standard	ANSI N170-1976 was revised in 1981 to ANSI/ANS-2.8, which in turn was revised in 1992. This reference should be updated to ANSI/ANS-2.8-1992 if a detailed comparison of the two versions supports the adoption of the more recent standard.

SRP Draft Section 2.4.4
Attachment B - Cross Reference of Integrated Impacts

Integrated Impact No.	Issue	SRP Subsections Affected
392	Regulatory Guide 1.59 references ANSI N170-1976, which was revised in 1981 to ANSI/ANS-2.8, which in turn was revised in 1992. In addition, ANSI N170 is referenced in this and several other sections of the SRP. Such references should be updated to ANSI/ANS-2.8-1992 in RG 1.59 and the SRP if a detailed comparison of the two versions supports the adoption of the more recent standard. No changes were made in the text or references of SRP Section 2.4.4.	Subsection II, paragraph 2 Subsection II, last paragraph Subsection VI, Reference 22
1209	Revise the SRP to incorporate the new and revised requirements from proposed rulemaking 59 FR 52255.	This is a placeholder integrated impact and will not be processed further.
1341	The Commission has approved specific staff positions and criteria for elimination of the OBE (see Section 1.M of SECY 93-087 and the associated SRM). The coincident OBE and standard project flood addressed in this subsection should be eliminated or replaced with an appropriate combination of flood and seismic event, based on a staff assessment of the matter.	Subsection I, paragraph 3
1466	Update the citation of ANSI N170 to cite the 1976 version.	Subsection VI