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(Formerly NUREG-75/087)

U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

OFFICE OF NUCLEAR REACTOR REGULATION

3.9.3 ASME CODE CLASS 1, 2, AND 3 COMPONENTS, COMPONENT SUPPORTS, AND CORE SUPPORT STRUCTURES

REVIEW RESPONSIBILITIES

Primary - Mechanical Engineering Branch (EMEB[1])

Secondary - None

I. AREAS OF REVIEW

The EMEB[2] reviews the information presented in the applicant's safety analysis report (SAR) concerning the structural integrity of pressure-retaining components, their supports, and core support structures which are designed in accordance with the rules of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, Division 1 (hereinafter "the Code"~~) (~~Reference 3)[3] and General Design Criteria 1, 2, 4, 14, and 15 ~~(Reference 2)~~.[4]

The staff review~~s~~[5] covers the following specific areas:

1. Loading Combinations, System Operating Transients, and Stress Limits

   The design and service loading combinations (e.g., design and service loads, including system operating transients, in combination with loads calculated to result from postulated seismic and other events) specified for Code constructed items designated as Code Class 1, 2, 3 (including Class 1, 2, and 3 component support structures) and ~~CS~~[6] core support structures are reviewed to determine that appropriate design and service limits have been designated for all loading combinations. ~~This review~~The reviewer[7] ascertains that the design and service stress limits and deformation criteria comply with the applicable limits specified in the Code and Appendix A to this Standard Review Plan (SRP)[8] section. Service stress limits which allow inelastic deformation of Code Class 1, 2, and 3 components, component supports, and ~~Class CS~~[9] core support structures are evaluated as are the justifications for the proposed design procedures. Piping which is "field run" should be included. Internal parts of components, such as valve discs and seats and pump shafting, subjected to dynamic loading during operation of the component should be included.

2. Design and Installation of Pressure Relief Devices

The design and installation criteria applicable to the mounting of pressure relief devices (safety valves and relief valves) for the overpressure protection of Code Class 1, 2, and 3 components are reviewed. The review includes evaluation of the applicable loading combinations and stress criteria. The design review extends to consideration of the means provided to accommodate the rapidly applied reaction force that occurs[10] when a safety valve or relief valve opens, and the transient fluid-induced loads applied to the piping downstream of a safety or relief valve in a closed discharge piping system. The dynamic structural response due to BWR safety relief valve discharge into the suppression pool is also considered.

The design of safety and relief valve systems is reviewed with respect to the load combinations ~~imposed on~~postulated for[11] the safety or relief valves, upstream piping or header, downstream or vent piping, system supports, and BWR suppression pool discharge devices such as ramsheads and quenchers.

The load combinations should ~~identify~~include[12] the most severe combination of the applicable loads due to internal fluid weight, momentum and pressure, dead weight of valves and piping, thermal load under heatup, steady state and transient valve operation, reaction forces when valves are discharging (thrust, bending, and torsion), seismic forces, and dynamic forces due to BWR safety relief valve discharge into the suppression pool as applicable. The reaction loads due to discharge of loop seal water slugs and subcooled or saturated liquid under transient or accident conditions shall also be included as valve discharge loads.

The structural response of the piping and support system is reviewed with particular attention to the dynamic or time-history analyses employed in evaluating the appropriate support and restraint stiffness effects under dynamic loadings when valves are discharging.

~~Where~~If[13] the use of hydraulic snubbers is proposed, the snubber performance characteristics are reviewed to ~~assure~~ensure[14] that their effects have been considered in the analyses under steady state valve operation and repetitive load applications caused by cyclic valve opening and closing during the course of a pressure transient.

3. Component Supports

The review of information submitted by the applicant includes an evaluation of Code Class 1, 2, and 3 components supports. The review includes an assessment of design and structural integrity of the supports. The review addresses three types of supports: plate and shell, linear, and component standard types. All the component supports of these three types are covered in this SRP section. Although classified as component standard supports, snubbers require special consideration due to their unique function. Snubbers provide no load path or force transmission during normal plant operations but function as rigid supports when subjected to dynamic transient loads. Component supports are those metal supports which are designed to transmit loads from the pressure-retaining boundary of the component to the building structure. The methods of analysis for calculating the responses of the reactor coolant pressure boundary supports resulting from the combination of LOCA and SSE events are reviewed in SRP Sections 3.6.2 and 3.9.2.

Review Interfaces[15]

The EMEB also performs the following reviews under the SRP sections indicated:

~~The Equipment Qualification Branch (EQB) e~~Evaluates the operability of pumps and valves and ~~judges~~ the design criteria for pressure-relieving devices which may have an active function during and after a faulted plant condition against the requirements ~~of the~~related to component operability assurance and seismic qualification[16] programs, as part of its primary review responsibility for SRP Section 3.10.[17]

In addition, the ~~MEB~~EMEB[18] will coordinate other branches evaluations that interface with the overall review of this SRP section as follows:[19]

A.[20] The ~~Auxiliary Systems Branch (ASB)~~Plant Systems Branch (SPLB)[21] verifies that the number and size of valves specified for the steam and feedwater systems have adequate pressure-relieving capacity as part of its primary review responsibility for SRP Section 10.3.

B. The Reactor Systems Branch (~~RSB~~SRXB[22]) verifies that the number and size of valves specified for the reactor coolant pressure boundary have adequate pressure-relieving capacity as part of its primary review responsibility for SRP Section 5.2.2. The SRXB reviews the design of systems and components that interface with the reactor coolant system with regard to intersystem loss-of-coolant accidents (ISLOCA) as part of its primary review responsibility for SRP Section 3.12 (proposed).[23] The SRXB also verifies that the applicant has identified and addressed piping connected to the reactor colant system that is subject to thermally stratified flow, thermal striping, and/or thermal cyclic effects, for residual heat removal and emergency core cooling systems, as part of its primary review responsibility for SRP Sections 5.4.7 and 6.3.[24]

C. The Containment Systems and Severe Accident Branch (SCSB)[25] reviews the applicant's analyses of subcompartment differential pressures resulting from postulated pipe breaks as part of its primary review responsibility for SRP Section 6.2.1.2.

D. The Materials and Chemical Engineering Branch (EMCB) reviews programs for ensuring bolting and threaded fastener adequacy and integrity, as part of its primary review responsibility for SRP Section 3.13 (proposed).[26]

For those areas of review identified above as being reviewed as part of the ~~primary~~ review ~~responsibility of other branches~~under other SRP sections, the acceptance criteria necessary for the review and their methods of application are contained in the referenced SRP sections ~~of the corresponding primary branch~~.[27]

II. ACCEPTANCE CRITERIA

EMEB acceptance criteria are based on meeting the relevant requirements of the following regulations:

A. 10 CFR ~~Part 50, §~~[28]50.55a and General Design Criterion 1 as ~~it relates~~they relate[29] to structures and components being designed, fabricated, erected, constructed, tested, and inspected to quality standards commensurate with the importance of the safety function to be performed.

B. General Design Criterion 2 as it relates to structures and components important to safety being designed to withstand the effects of earthquakes combined with the effects of normal or accident conditions.

C. General Design Criterion 4 as it relates to structures and components important to safety being designed to accommodate the effects of and to be compatible with the environmental conditions of normal and accident conditions.

D. General Design Criterion 14 as it relates to the reactor coolant pressure boundary being designed, fabricated, erected, and tested to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

E. General Design Criterion 15 as it relates to the reactor coolant system being designed with sufficient margin to ~~assure~~ensure that the design conditions are not exceeded.

Specific criteria necessary to meet the relevant requirements of §50.55a and General Design Criteria 1, 2, 4, 14, and 15, by which the areas of review defined in subsection I of this SRP section are judged to be acceptable,[30] are as follows:

1. Loading Combinations, System Operating Transients, and Stress Limits

The design and service loading combinations, including system operating transients, and the associated design and service stress limits considered for each component and its supports should be sufficiently defined to provide the basis for design of Code Class 1, 2, and 3 components~~,~~ and component supports,[31] and ~~Class CS~~[32] core support structures for all conditions.

The acceptability of the combination of design and service loadings (including system operating transients), applicable to the design of Class 1, 2, and 3 components, component supports, and ~~Class CS~~[33] core support structures, and of the designation of the appropriate design or service stress limit for each loading combination, is judged by comparison with positions stated in Appendix A, and with appropriate standards acceptable to the staff developed by professional societies and standards organizations.

The design criteria for internal parts of components such as valve discs, seats, and pump shafting should comply with applicable ASME Code or Code Case criteria. In those instances where no ASME criteria exist, the design criteria are acceptable if they ~~assure~~ensure the structural integrity of the part such that no safety-related functions are impaired.

2. <u>Design and Installation of Pressure Relief Devices</u>

The applicant should use design criteria for pressure relief ~~stations~~installations[34] specified in Appendix O, ASME Code, Section III, Division 1, "Rules for the Design of Safety Valve installations" (Reference 6). In addition, the following criteria are applicable:

(1) Where more than one valve is installed on the same ~~run pipe~~pipe run,[35] the sequence of valve openings to be assumed in analyzing for the stress at any piping location should be that sequence which is estimated to induce the maximum instantaneous value of stress at that location.

(2) Stresses should be evaluated, and applicable stress limits should be satisfied for all components of the ~~run pipe~~pipe run[36] and connecting systems and the pressure relief valve station, including supports and all connecting welds between these components.

(3) In meeting the stress limit requirements, the contribution from the reaction force and the moments resulting from that force should include the effects of the Dynamic Load Factor or should use the maximum instantaneous values of forces and moments for that location as determined by the dynamic hydraulic/structural system analysis. This requirement should be satisfied In demonstrating satisfaction of all design limits at all locations of the run pipe and the pressure relief valve for Class 1, 2, and 3 piping. A Dynamic Load Factor (DLF) of 2.0 may be used in lieu of a dynamic analysis to determine the DLF.

The SAR ~~must~~should[37] also include a description of the calculational procedures, computer programs, and other methods to be used in the analysis. The analysis must include the time history or equivalent effects of changes of momentum due to fluid flow changes of direction. The fluid states considered must include postulated water slugs where water seals are used and subcooled or saturated liquid if such fluid can be discharged under postulated transient or accident conditions. ~~Plants~~Applicants for plants[38] utilizing suppression pools ~~shall~~should[39] also consider the applicable pool dynamic loads on the safety relief valve system. Stress computations and stress limits must be in accord with applicable rules of the Code.

3. Component Supports

a. The component support designs should provide adequate margins of safety under all combinations of loadings. The combination of loadings (including system operating transients) considered for each component support within a system, including the designation of the appropriate service stress limit for each loading combination should meet the criteria in Appendix A,~~ and~~ Regulatory Guides 1.124 and 1.130, ~~(References 7 and 8)~~and Section III, Division 1, subsection NF of the Code.[40]

Component supports of active pumps and valves should be considered in context with the other features of the operability assurance and seismic qualification[41] program as presented in SRP Section 3.10. If the component support ~~affects~~deformation can be expected to affect[42] the operability requirements of the supported component, then deformation limits should also be specified. Such deformation limits should be compatible with the operability requirements of the ~~components supported and~~supported components. These deformation limits should be[43] incorporated into the operability assurance and seismic qualification[44] program. In establishing allowable equipment[45] deformations, the possible movements of the support base structures must be taken into account.

b. ~~Where snubbers are utilized as supports for safety-related systems and components, acceptable criteria~~Criteria[46] for snubber operability assurance should contain the following elements:

(1) Structural Analysis and Systems Evaluation.

Systems and components which utilize snubbers as shock and vibration arresters must be analyzed to ascertain the interaction of such devices with the systems and components to which they are attached. Snubbers may be used as shock and vibration arresters and in some instances as dual purpose snubbers~~. When used as a vibration arrestor or dual purpose snubbers,~~ and when so used[47] fatigue strength must be considered. Important factors in the fatigue evaluation include:

(i)[48] unsupported system component movement or amplitude,

(ii) force imparted to snubber and corresponding reaction on system or component due to restricting motion (damped amplitude),

(iii) vibration frequency or number of load cycles, and

(iv) verification of system or component and snubber fatigue strength.

Snubbers used as shock arresters do not require fatigue evaluation if it can be demonstrated that:

(ia) the number of load cycles which the snubber will experience during normal plant operating conditions is small (<2500) or

(iib[49]) motion during normal plant operating conditions does not exceed snubber dead band.

Snubbers utilized in systems or components which may experience high thermal growth rates, either during normal operating conditions or as a result of anticipated transients, should be checked to assureensure that such thermal growth rates do not exceed the snubber lock-up velocity.

(2) Characterization of Mechanical Properties.

A most important aspect of the structural analysis is realistic characterization of snubber mechanical properties (i.e. spring rates) in the analytical model. Since the "effective" stiffness of a snubber is generally greater than that for the snubber support assembly (i.e., the snubber plus clamp, transition tube extension, back-up support structure, etc.) the snubber response characteristics may be "washed out" by the added flexibility in the support structure. The combined effective stiffness of the snubber and support assembly must therefore be considered in evaluating the structural response of the system or component.

Snubber spring rate should be determined independent of clearance/lost motion, activation level, or release rate. The stiffness should be based on structural and hydraulic compliance only, and should consider the effects of temperature, and the effects of temperature should be considered.[50]

The snubber end fitting clearance, mismatch of end fitting clearances, mismatch of activation and release rates,[51] and lost motion must be minimized and should be considered when calculating snubber reaction loads and stress which are based on a linear analysis of the system or component. This is especially important in multiple snubber applications where mismatch of end fitting clearance has a greater effect on the load sharing of these snubbers than does the mismatch of activation level or release rate. Equal load sharing of multiple snubber supports should not be assumed if mismatch in end fitting clearance exists.

(3) Design Specifications

The required structural and mechanical performance of snubbers is determined from the user's systemapplicant's structural analysis described in subsections II.3.b[52](1) and (2). The snubber Design Specification is the instrument provided by the purchaser to the supplier to ~~assure~~ensure that the requirements are met. The Design Specification should contain:

(i) the general functional requirements,

(ii) operating environment,

(iii) applicable codes and standards,

(iv) materials of construction and standards for hydraulic fluids and lubricants,

(v) environmental, structural, and performance design verification tests, including required dynamic qualification, testing and extrapolation methods supporting qualification of large bore hydraulic snubbers with rated load capacities of 50 Kips or more as recommended in NUREG/CR-5416 (Reference 14),[53]

(vi) production unit functional verification tests and certification,

(vii) packaging, shipping, handling, and storage requirements, and

(viii)[54] description of provisions for attachments and installation.

In addition, the procurement program should include provisions for the snubber manufacturer~~ should be requested~~ to[55] submit~~ his~~[56] quality assurance and assembly quality control procedures for review and acceptance by the purchaser.

(4) Installation and Operability Verification

Assurance that all snubbers ~~and~~are[57] properly installed prior to preoperational piping vibration and plant start-up tests should be provided. Visual observation of piping systems and measurement of thermal movements during plant start-up tests ~~could~~may be used by the applicant to[58] verify that snubbers are operable (not locked up). Provisions for such examinations and measurements should be discussed in the piping preoperational vibration and plant start-up test programs as described in SRP Section 3.9.2.

(5) Use of Additional Snubbers

Snubbers could in some instances be installed during or after plant construction~~ which~~. These snubbers[59] may not have been included in the design analysis. This could occur as a result of unanticipated piping vibration, as discussed in SRP Section 3.9.2,[60] or interference problems during construction. The effects of such ~~installation~~snubbers[61] should be fully evaluated and documented to demonstrate that normal plant operations and safety are not diminished.

(6) Inspection and Testing

Inservice inspection and testing are critical elements of operability assurance programs for mechanical components. The applicant should provide a discussion of accessibility provisions for maintenance, inservice inspection and testing, and possible repair or replacement of snubbers consistent with the requirements of the NRC Standard Technical Specifications.

(7) Classification and Identification

All safety-related components which utilize snubbers in their support systems should be identified and tabulated in the FSAR. The tabulation should include the following information:

(i) identification of the systems and components in those systems which utilize snubbers,

(ii) the number of snubbers utilized in each system and on components in that system,

(iii) the type(s) of snubber (hydraulic or mechanical) and the corresponding supplier ~~identified~~,[62]

(iv) specify whether the snubber was constructed to the rules of ASME Code Section III, Subsection N~~H~~F[63],

(v) state whether the snubber is used as a shock, vibration, or dual purpose snubber, and

(vi)[64] for snubbers identified as either dual purpose or vibration arrestor type, indicate if both snubber and component were evaluated for fatigue strength.

Technical Rationale[65]

The technical rationale for application of these acceptance criteria to reviewing ASME Class 1, 2, and 3 components component supports and core support structures is discussed in the following paragraphs:[66]

(1) Compliance with 10 CFR 50.55a requires that components and structures be designed, fabricated, constructed, tested, and inspected to quality standards commensurate with the importance of the safety function to be performed. Quality Group A, B, and C

components must meet specific provisions of the ASME Boiler and Pressure Vessel Code.

SRP Section 3.9.3 provides guidance for the staff's review of loading conditions, stresses, and stress limits for the subject components and structures. Loading conditions and stress limits are described in this SRP section, its Appendix A, and Section III, Division 1, subsection NF of the Code. Stresses, stress limits, and loading combinations are specified in these documents that are appropriate to the conditions that can be expected during the life of the plant. SRP Section 3.9.3 also provides guidance for the staff's review of interfacing issues such as design specifications, mechanical properties, and testing, as appropriate. SRP Section 3.9.3 provides related guidance on component supports as well as the installation of pressure relief devices. The guidance cites the provisions of the ASME B&PV Code. This guidance is designed to be in compliance with 10 CFR 50.55a.

Meeting the requirements of 10 CFR 50.55a provides assurance that components and structures important to safety are capable of performing their intended functions.[67]

(2) Compliance with GDC 1 requires that components and structures important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed.

SRP Section 3.9.3 provides guidance for the staff's review of loading conditions, stresses, and stress limits for the subject components and structures which are important to safety. Loading conditions, stresses, and stress limits are described in this SRP section, its Appendix A, and Section III, Division 1, subsection NF of the Code. Stress limits and loading combinations are specified in these documents that are appropriate to the conditions that can be expected during the life of the plant. SRP Section 3.9.3 also provides guidance for the staff's review of interfacing issues such as design specifications, mechanical properties, and testing, as appropriate. SRP Section 3.9.3 provides related guidance on component supports as well as the installation of pressure relief devices. The guidance cites the provisions of the ASME B&PV Code to compute stresses and stress limits. This guidance is designed to be in compliance with GDC 1.

Meeting the requirements of GDC 1 provides assurance that components and structures important to safety are capable of performing their intended functions.[68]

(3) Compliance with GDC 2 requires that components and structures important to safety be designed to withstand the effects of expected natural phenomena combined with the appropriate effects of normal and accident conditions, without loss of capability to perform their safety functions.

SRP Section 3.9.3 provides guidance for the staff's review of loading combinations, stresses and stress limits for the subject components and structures which are important to safety. These loading combinations include consideration of the effects of expected natural phenomena combined with the appropriate effects of normal and accident conditions. The stresses and stress limits (computed in accordance with the ASME

B&PV Code) are evaluated to be acceptable to the staff to ensure that equipment is designed to withstand these conditions without loss of capability to perform their intended functions. This guidance is designed to be in compliance with GDC 2.

Meeting the requirements of GDC 2 provides assurance that components and structures important to safety are capable of performing their intended safety functions.[69]

(4) Compliance with GDC 4 requires that the nuclear power plant structures and components important to safety be designed to accommodate the effects of and be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents.

SRP Section 3.9.3 provides guidance for the staff's review of the subject components and structures which are important to safety. This guidance includes consideration of loading effects and the resulting stresses (computed in accordance with the ASME B&PV Code) associated with normal operation, maintenance, testing, and postulates accidents, including loss-of-coolant accidents. This guidance is designed to be in compliance with GDC 4.

Meeting the requirements of GDC 4 provides assurance that components and structures important to safety are capable of performing their intended safety functions.[70]

(5) Compliance with GDC 14 requires that the reactor coolant pressure boundary be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, rapidly propagating failure, and gross rupture.

SRP Section 3.9.3 provides guidance for the staff's review of ASME Class 1 components and component supports, including core support structures. This guidance cites the requirements of the ASME B&PV Code to compute stresses and stress limits that are based on the loads and load combinations described in the SRP section. Meeting these requirements provides additional assurance that components that are part of the reactor coolant pressure boundary will be designed so as to have an extremely low probability of abnormal leakage, rapidly propagating failure, and gross rupture. This guidance is designed to be in accordance with GDC 14.

Meeting these requirements provides assurance that components that are part of the reactor coolant pressure boundary are capable of performing their intended safety functions and prevent the spread of radioactive materials.[71]

(6) Compliance with GDC 15 requires that the reactor coolant system be designed with sufficient margin to ensure that the design conditions of the reactor coolant pressure boundary are not exceeded during any condition of normal operation, including anticipated operational occurrences.

SRP Section 3.9.3 provides guidance for the staff's review of ASME Class 1 components and component supports, including core support structures. This guidance cites the requirements of the ASME B&PV Code to compute stresses and stress limits that are based on the loads and load combinations described in the SRP section. Meeting these requirements provides additional assurance that components that are part of the reactor coolant system are designed with sufficient margin to ensure that the design conditions of the reactor coolant pressure boundary are not exceeded during any condition of normal operation, including anticipated operational occurrences. This guidance is designed to be in accordance with GDC 15.

Meeting these requirements provides assurance that the reactor coolant pressure boundary is capable of performing its intended safety function and prevent the spread of radioactive materials.[72]

III. REVIEW PROCEDURES

The reviewer will select and emphasize material from the procedures described below, as may be appropriate for a particular case.

For each area of review, the following review procedures apply:

1. Loading Combinations, System Operating Transient, and Stress Limits

The objectives in reviewing the loading combinations and stress limits employed by the applicant in the design of Code Class 1, 2, and 3 components, component supports, and ~~Class CS~~[73] core support structures are to confirm that the appropriate postulated events have been included, that the loading combinations (including system operating transients) and the designation of design and service stress limits are appropriate. ~~The review conducted during the CP stage~~At the CP stage, the reviewer[74] determines that the objectives have been addressed and are being implemented in the design by obtaining a commitment from the applicant that specific design criteria will be utilized.

By checking selected Code required Design Documents such as Design Reports, Load Capacity Data Sheets, and related material, the ~~OL stage review verifies~~reviewer verifies at the OL stage[75] that the design criteria have been utilized and that components have been designed to meet the objectives. To ~~assure~~ensure that these objectives are met, the review is performed as follows:

a. The applicant's proposed design and service loadings, and combinations thereof, are reviewed for completeness and for appropriate designation of corresponding design and service stress limits.

b. The combination of design and service loadings, including procedures for combination, proposed by the applicant for each Code-constructed item are reviewed to determine if they are adequate. This aspect of the review is made by comparison with the loading combinations and procedures for combination set forth in Appendix A. Deviations from the position are evaluated on a case-by-case basis by questions addressed to the applicant to determine the rationale and justification for exceptions. Final determination is based on engineering judgment and past experience with prior applications.

c. The design and service stress limits selected by the applicant for each set of design and service loading combinations as established in (a)[76] are reviewed to determine if they meet those specified in Appendix A. The provisions forcriteria to ensure[77] piping component functional capability are reviewed to determine their adequacy in meeting the objectives set forth in Appendix A. Deviations from the position may be permitted provided justification is presented by the applicant. The acceptability determination is based on considerations of adequate margins of safety.

In the ABWR and System 80+ design certification FSERs the Staff accepted an exemption to 10 CFR 100 Appendix A requiring that all safety-related SSCs be designed to remain functional and within applicable stress and deformation limits when subjected to an OBE. Acceptance of the exemption was predicated on the use of an alternative seismic analysis based entirely on the SSE and implementation of additional procedural requirements relating to a seismic event. The Staff's evaluation of ASME Code Class 1, 2, and 3 components and core support structures ensured that appropriate measures and adequate safety margins were maintained when the OBE was eliminated from design.[78]

2. Design and Installation of Pressure Relief Devices

The objective of the review of the design and installation of pressure relief devices is to assure the adequacy of the design and installation so that there is assurance ofensure[79] the integrity of the pressure relieving devices and associated piping during the functioning of one or more of the relief devices. In the CP review, it is determined whetherif[80] there is reasonable assurance that the final design will meet these objectivesthis objective.[81] At the OL stage, the final design is reviewed to determine that the objectives haveobjective has[82] been met.

The review is performed as follows:

a. The design of the pressure retaining boundary of the device is reviewed by comparison with the Code. Since explicit rules are not yet available within the Code for the design of safety and pressure relief valves, the design is reviewed on the basis of reference to sections of the Code on vessels, piping, and line valves, and ASME Code Case N-100 (Reference 6).Appendix O, ASME Code, Section III, Division 1, "Rules for the Design of Safety Valve Installations" and the additional acceptance criteria in subsection II.2 in this SRP section.[83]

   Allowable stress limits are compared with those in the Code for the appropriate class of construction. Deviations are identified and the applicant is requested to provide justification. Stress limits and loading combinations are covered under the areasin the subsections[84] entitled "Loading Combinations, System Operating Transients, and Stress Limits" (subsections II.1 and III.1)[85] in this SRP section.

b. The design of the installation is reviewed for structural adequacy to withstand the dynamic effects of relief valve operation. The applicant should include and discuss: reaction force, valve opening sequence, valve opening time, method of analysis, and magnitude of a dynamic load factor (if used). In reaching an acceptance determination, the reviewer compares the submission with the requirements in subsection II.2 of this SRP section.

Where deviations occur, they are identified and the justification is evaluated. Valve opening sequence effects must ~~consider the worst~~include the worst-case load combination ~~possible~~[86] and forcing functions must be justified with valve opening time data. The review is based in part on comparisons with prior acceptable designs tested in operating plants.

3. Component Supports

The objective in the review of component supports is to determine that adequate attention has been given the various aspects of design and analysis, so that there is assurance as to structural integrity of supports and as to operability of active components that interact with component supports.

The reviewer should be assured that the applicant's PSAR contains discussions and commitments to develop and utilize a snubber operability assurance program containing the elements specified in paragraphs (1) through (6) of subsection II.3.b of this SRP section. A commitment to provide in the FSAR the information specified in paragraph (7) of subsection II.3.b of this SRP section is sufficient for the CP review stage. During the OL review the FSAR should contain summaries in sufficient detail to verify the PSAR commitments.

The structural integrity of the three types of component supports described in subsection I.3 of this SRP section are reviewed against the criteria and guidelines of subsection II.3 of this SRP section.

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.[87]

IV. EVALUATION FINDINGS

The reviewer verifies that sufficient information has been provided in accordance with the requirements of this SRP section, and that ~~his~~ the evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

[88]The staff concludes that the specified design and service combinations of loadings as applied to ASME Code Class 1, 2, and 3 pressure retaining components are acceptable

and meet the requirements of 10 CFR ~~Part 50, §~~[89]50.55a and General Design Criteria 1, 2, 4, 14, and 15. This conclusion is based on the following:

1. The applicant met the requirements of 10 CFR ~~Part 50, §~~[90]50.55a and General Design Criteria 1, 2~~, and~~ 4, 14, and 15[91] with respect to the design and service load combinations and associated stress and deformation limits specified for ASME Code Class 1, 2, and 3 components by ensuring[92] that systems and components important to safety are designed to quality standards commensurate with their importance to safety and that these systems can accommodate the effects of normal operation as well as postulated events such as loss-of-coolant accidents and the dynamic effects resulting from earthquakes. The specified design and service combinations of loadings, as applied to ASME Code Class 1, 2, and 3 pressure retaining components in systems designed to meet seismic Category I standards, are such as to provide assurance that,[93] in the event of an earthquake affecting the site or other service loadings due to postulated events or system operating transients, the resulting combined stresses imposed on system components will not exceed allowable stress and strain limits for the materials of construction. Limiting the stresses under such loading combinations provides a conservative basis for the design of system components to withstand the most adverse combination of loading events without loss of structural integrity.

2. The applicant has met the requirements of 10 CFR ~~Part 50, §~~[94] 50.55a and General Design Criteria 1, 2, and 4 with respect to the criteria used for design and installation of ASME Code Class 1, 2, and 3 overpressure relief devices by ensuring that safety and relief valves and their installations are designed to standards which are commensurate with their safety functions, and that they can accommodate the effects of discharge due to normal operation as well as postulated events such as loss-of-coolant accidents and the dynamic effects resulting from the safe shutdown earthquake. The relevant requirements of General Design Criteria 14 and 15 are also met with respect to ~~assuring~~ensuring that the reactor coolant pressure boundary design limits for normal operation, including anticipated operational occurrences are not exceeded. The criteria used by the applicant in the design and installation of ASME Class 1, 2, and 3 safety and relief valves provide adequate assurance that, under discharging conditions, the resulting stresses will not exceed allowable stress and strain limits for the materials of construction. Limiting the stresses under the loading combinations associated with the actuation of these pressure relief devices provides a conservative basis for the design and installation of the devices to withstand these loads without loss of structural integrity or impairment of the overpressure protection function.

3. The applicant has met the requirements of 10 CFR ~~Part 50, §~~[95] 50.55a and General Design Criteria 1, 2, and 4 with respect to the design and service load combinations and associated stress and deformation limits specified for ASME Code Class 1, 2, and 3 component supports by ensuring that component supports important to safety are designed to quality standards commensurate with their importance to safety, and that these supports can accommodate the effects of

normal operation as well as postulated events such as loss-of-coolant accidents and the dynamic effects resulting from the safe shutdown earthquake. The combination of loadings (including system operating transients) considered for each component support within a system, including the designation of the appropriate service stress limit for each loading combination, has met the positions and criteria of Regulatory Guides 1.124 and 1.130, the positions of Appendix A to this SRP section, and the criteria described in Section III, Division 1, subsection NF,[96] and are in accordance with NUREG-0484 and NUREG-0609. The specified design and service loading combinations used for the design of ASME Code Class 1, 2, and 3 component supports in systems classified as seismic Category I provide assurance that in the event of an earthquake or other service loadings due to postulated events or system operating transients, the resulting combined stresses imposed on system components will not exceed allowable stress and strain limits for the materials of construction. Limiting the stresses under such loading combinations provides a conservative basis for the design of support components to withstand the most adverse combination of loading events without loss of structural integrity.

~~Class CS component~~Core support structures[97] evaluation findings are covered in SRP Section 3.9.5 in connection with reactor internals.

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.[98]

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.[99] 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.[100] The positions stated in Section C.1.1, 4th and 5th paragraphs of Appendix A to this SRP section to address stress and fatigue evaluation/analyses for ASME Code Class piping (including susceptible Class 2 and 3 piping) subject to thermal stratification, oscillation, striping, etc. apply to new applications only.[101]

Implementation schedules for conformance to parts of the method discussed herein are contained in the referenced regulatory guides~~ and~~, NUREGs, and Bulletins[102].

VI. REFERENCES

1. 10 CFR Part 50, 50.55a, "Codes and Standards."

2. 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants":[103]

   (a) General Design Criterion 1, "Quality Standards and Records";

   (b) General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena";

   (c) General Design Criterion 4, "Environmental and Missile Design Bases";

   (d) General Design Criterion 14, "Reactor Coolant Pressure Boundary"; and

   (e) General Design Criterion 15, "Reactor Coolant System Design."

3. ASME Boiler and Pressure Vessel Code, Section III, Division 1, "Nuclear Power Plant Components," American Society of Mechanical Engineers.

4. Standard Review Plan Section 3.10, "Seismic and Dynamic Qualification of Mechanical and Electrical Equipment Important to Safety."

5. Appendix A to SRP Section 3.9.3, "Stress Limits for ASME Class 1, 2, and 3 Components and Component Supports, ~~of Safety-Related Systems~~[104] and ~~Class CS~~[105] Core Support Structures Under Specified Service Loading Combinations."

6. ~~ASME Code Case N-100, "Pressure Relief Valve Design Rules, Section III, Division 1, Class 1, 2 and 3."~~ASME Boiler and Pressure Vessel Code, Section III, Division 1, Appendix O, "Rules for the Design of Safety Valve Installations."[106]

7. Regulatory Guide 1.124, "Design Limits and Loading Combinations for Class 1 Linear-Type Component Supports."

8. Regulatory Guide 1.130, "Design Limits and Loading Combinations for Class 1 Plate- and Shell-Type Component Supports."

9. NUREG-0484, "Methodology for Combining Dynamic Loads."

10. NUREG-0609, "Asymmetric Blowdown Loads on PWR Primary Systems."

11. NUREG-1367, "Functional Capability of Piping Systems."[107]

12. NRC Bulletin 88-08, “Thermal Stresses in Piping Connected to Reactor Coolant Systems,” June 22, 1988 and its Supplements 1 through 3.

13. NRC Bulletin 88-11, Pressurizer Surge Line Thermal Stratification, December 20, 1988.[108]

14. NUREG/CR-5416, "Technical Evaluation of Generic Issue 113: Dynamic Qualification and Testing of Large Bore Hydraulic Snubbers"; Nitzel, M. E.; Ware, A. G. EG&G Idaho, Inc.; Page, J. D. NRC; September 1992 (EGG-2571).[109]

APPENDIX A

STANDARD REVIEW PLAN SECTION 3.9.3

STRESS LIMITS FOR ASME CLASS 1, 2, AND 3 COMPONENTS AND COMPONENT SUPPORTS, ~~OF SAFETY-RELATED SYSTEMS~~[110] AND ~~CLASS CS~~[111] CORE SUPPORT STRUCTURES
UNDER SPECIFIED SERVICE LOADING COMBINATIONS

A. INTRODUCTION

[112] Nuclear power plant components and supports are subjected to combinations of loadings derived from plant and system operating conditions, natural phenomena, postulated plant events, and site-related hazards. Section III, Division 1 of the ASME Code (hereafter referred to as the Code) provides specific sets of design and service stress limits that apply to the pressure retaining or structural integrity of components and supports when subjected to these loadings.[113]

Conditions also warranting consideration include thermally stratified flow, thermal striping, and/or thermal cyclic effects and the resulting spatial or temporal stresses on piping and components. Such conditions, where not identified and accounted for in stress analysis and fatigue evaluations of affected piping, can result in unacceptable stresses, pipe movements, deformations, and/or fatigue failures. These phenomena have typically been observed in feedwater piping, at feedwater nozzles, in PWR pressurizer surge lines, in piping between PWR pressurizers and associated relief valves, and at locations where piping normally containing relatively cool fluid is connected to the reactor coolant system via valves subject to intermittent leakage such as at residual heat removal and emergency core cooling system connections to the reactor coolant system (References 12 and 13).[114]

The design and service stress limits specified by the Code do not ~~assure~~ensure, in themselves, the operability of components, including their supports, to perform the mechanical motion required to fulfill the component's safety function. Certain of the service stress limits specified by the Code (i.e., level C and D) may not ~~assure~~ensure the functional capability of components, including their supports, to deliver rated flow and retain dimensional stability. ~~Since the~~The combination of loadings, the selection of the applicable design and service stress limits appropriate to each load combination, and the proper consideration of operability is beyond the scope of the Code.~~; and the~~ The treatment of functional capability, including collapse and deflection limits, is not adequately treated by the Code for all situations. ~~, such~~Such factors ~~must~~should[115] be evaluated~~ by designers~~[116] and appropriate information developed for inclusion in the Design Specification or other referenced documents.

Applicants require guidance with regard to the selection of acceptable design and service stress limits associated with various loadings and combinations thereof, resulting from plant and system operating conditions and design basis events, natural phenomena, and site-related hazards. The relationship and application of the terms "design conditions," "plant operating conditions," "system operating conditions," and the formerly used term "component operating conditions," now characterized by four levels of service stress limits, have not been clearly understood by applicants and their subcontractorsrequire clarification.[117]

For example, under the "faulted plant or system condition" (e.g., due to LOCA within the reactor coolant pressure boundary), the emergency core cooling system (ECCS) should be designed to operate and deliver rated flow for an extended period of time to assureensure the safe shutdown of the plant. Although the "plant condition" is termed "faulted," components in the functional ECCS must perform the safety function under a specified set of service loadings which includes those resulting from the specified plant postulated events. The selection of level "D" (related to the "faulted" condition) service stress limits for this system, based solely on the supposition that all components may use this limit for a postulated event resulting in the faulted plant condition cannot be justified, unless system operability is also demonstrated.

This appendix is necessaryThe objective of this appendix is[118] to improve consistency and understanding of the basic approach in the selection of load combinations applicable to safety-related systemsthe subject components and structures[119] and to establish acceptable relationships between plant postulated events, plant and system operating conditions, component and component support design, and service stress limits, functional capability, and[120] operability.

B. DISCUSSION

Current reviewsReviews[121] of both standardized plants and custom plants have indicated the need for additional guidance to reach acceptable design conclusions in the following areas:

(1) Relationship between certain plant postulated events, plant and system operating conditions, resulting loads and combinations thereof, and appropriate design and service stress limits for ASME Class 1, 2, and 3 components and component supports,[122] and Class CS[123] core support structures.

(2) Relationship of component operability assurance, functional capability, and allowable design and service stress limits for ASME Class 1, 2, and components and component supports.3 components and component supports, and core support structures.[124]

The Code provides five categories of limits applicable to design and service loadings (design, level A, level B, level C, and level D). The Code rules provide for structural integrity of the pressure retaining boundary of a component and its supports, but specifically exclude the subject of component operability and do not directly address functional capability. The types of loadings to be taken into account in designing a component are specified in the Code, but rules specifying how the loadings, (which result from postulated events and plant and system operating conditions,) are to be combined, and what stress level is appropriate for use with a particular loading combinations,[125] are not specified in the Code. It is the responsibility of the designer to include all this information in the Code required Design Specification of each component and support.

C. POSITION

~~Effective with the 1977 Edition, the~~The[126] Code provides design stress limits and four sets of service stress limits for all classes of components, component supports, and core support structures. The availability of such design and service stress limits within the Code requires that the EMEB[127] review and determine maximum acceptable design and service stress limits which may be used with specified loads, or combinations thereof, for components and component supports ~~of safety-related systems~~[128] (refer to definition in Table ~~III~~II[129]) and core support structures.

This appendix provides guidance ~~for dealing with the~~for reviewers on the following subjects regarding ASME Class 1, 2, and 3 components and component supports, ~~of safety-related systems~~ and core support structures ~~in the following areas~~:[130]

(1) Consideration of design loadings and limits.

(2) Consideration of service loading combinations resulting from postulated events and the designation of acceptable service limits.

(3) Consideration of piping functional capability and operability of active pumps and valves under service loading combinations resulting from postulated events.

(4) Applicability of the appendix to components, component support structures, and core support structures and procedures for compliance.

1.0 ASME CLASS 1, 2, AND 3 COMPONENTS, ~~AND~~ COMPONENT SUPPORTS, ~~OF SAFETY-RELATED SYSTEMS~~[131] AND ~~CLASS CS~~[132] CORE SUPPORT STRUCTURES

1.1 ~~Design Considerations and~~ Design Loadings and Design Limits[133]

ASME Code Class 1, 2, and 3 components, component supports, and ~~class CS~~[134] core support structures shall be designed to satisfy the appropriate subsections of the Code ~~in all respects~~ as required in 10 CFR 50.55a,[135] including limitations on pressure, and including[136] the requirements of this appendix. Component supports ~~that are intended to restrain either force and displacement or anchor movement~~[137] shall be designed to maintain deformations within appropriate limits as specified in the component support Design Specifications.

Design loadings shall be established in the Design Specification. The design limits of the appropriate subsection of the Code shall not be exceeded for the design loadings specified.

To avoid fatigue failure during the life of the plant, unisolable sections of piping connected to the reactor coolant system that are subject to stresses from temperature stratification or temperature oscillations as well as other typical piping stresses, including piping that may be rendered susceptible to these conditions through leaking valves, should be identified and designed to withstand combined stresses caused by various loads and the worst temporal and spatial distributions of temperature to be encountered in service. NRC Bulletin 88-08 (Reference 12) specifies acceptable actions in this regard. NRC Bulletin 88-11 (Reference 13) specifies acceptable actions to address thermally stratified flow and/or thermal striping in PWR pressurizer surge lines.[138]

Piping subject to stresses from temperature stratification or temperature oscillations, including piping that may be rendered susceptible to these conditions through leaking valves, should be explicitly identified and designed to account for these stresses.[139]

Fatigue evaluations are required by the Code for all Class 1 components. Fatigue evaluations should also be completed for all ASME Class 2 and 3 components and component supports, and core support structures that are subject to thermal cyclic effects or dynamic cyclic loads. The scope, methods, and results of fatigue evaluations should be reviewed by the staff. Fatigue analyses of components and supports should be completed if the fatigue evaluations so indicate and these analyses, as well as their results, should be reviewed and compared with the guidance in the Code. Fatigue evaluations and subsequent analyses (if required) of components and supports should be based on the design life of the plant. Environmental conditions which could have cumulative effects that could adversely affect the design margins that are built into the ASME fatigue design curves should also be considered.[140]

1.2 Service Loading Combinations

The identification of individual loads and the appropriate combination of these loads (i.e., sustained loads, loads due to system operating transients (SOT)[141], OBE, SSE, LOCA, DBPB, MS/FWPB and their dynamic effects) ~~shall~~should[142] be in accordance with Section 1.3. The appropriate method of combination of these loads ~~shall~~should[143] be in accordance with NUREG-0484, "Methodology for Combining Dynamic Loads." ~~(Reference 9).~~[144] Exemptions that have been permitted from regulatory requirements to use OBE and the acceptable alternative to use of OBE in the design of components, component supports, and core support structures are described in subsection III.1 of this SRP section.[145]

1.3 Service Conditions

1.3.1 Service Limit A

Class 1, 2, and 3 components, component supports, and Class CS[146] core support structures shall meet a service limit not greater than Level A when subjected to sustained loads resulting from normal plant/system operation.

1.3.2 Service Limit B

Class 1, 2, and 3 components, component supports, and Class CS[147] core support structures shall meet a service limit not greater than Level B when subjected to the appropriate combination of loadings resulting from (1) sustained loads, (2) specified plant/system operating transients (SOT), and (3) the OBE. Exemptions that have been permitted from regulatory requirements to use OBE and the acceptable alternative to use of OBE in the design of components, component supports, and core support structures are described in subsection III.1 of this SRP section.[148]

1.3.3 Service Limit C

(a) Class 1, 2, and 3 components, component supports, and Class CS[149] core support structures shall meet a service limit not greater than Level C when subjected to the appropriate combination of loadings resulting from (1) sustained loads, and (2) the DBPB.

(b) The DBPB includes loads from the postulated pipe break, itself, and also any associated system transients or dynamic effects resulting from the postulated pipe break.

1.3.4 Service Limit D

(a) Class 1, 2, and 3 components, component supports, and Class CS[150] core support structures shall meet a service stress limit not greater than Level D when subjected to the appropriate combination of loadings resulting from (1) sustained loads, (2) either the DBPB, MS/FWPB, or LOCA, and (3) and SSE.

(b) The DBPB, MS/FWPB, and LOCA include loads from the postulated pipe breaks, themselves, and also any associated system transients or dynamic effects resulting from the postulated pipe breaks. Asymmetric blowdown loads on PWR primary systems shallshould[151] be incorporated per NUREG-0609 (Reference 10).[152]

2.0 OPERABILITY AND FUNCTIONAL CAPABILITY

2.1 Active Pumps and Valves

SRP Section 3.10 ~~(Reference 4) shall~~provides guidance to reviewers to ensure that applicants demonstrate that ~~the~~ pumps or valves, as supported, can adequately sustain the designated combined service loadings at a stress level ~~at least equal to~~bounded by the specified service limit.~~, and can perform its~~ Such demonstration provides assurance that pumps and valves can perform their safety function without impairment.[153] Loads produced by the restraint of free end displacement and anchor point motions ~~shall~~should[154] be included.

2.2 Snubbers

The operability requirements specified for mechanical and hydraulic snubbers installed on safety-related systems is subject to review by the staff. When snubbers are used, their need ~~shall~~should[155] be clearly established and their design criteria presented.

2.3 Functional Capability

The design of Class 1, 2, and 3 piping components ~~shall~~should[156] include a functional capability assurance program. This program ~~shall~~should be used to[157] demonstrate that the piping components, as supported, can retain sufficient dimensional stability at service conditions so as not to impair the system's functional capability. The program may be based on tests, analysis, or a combination of tests and analysis. The functional capability assurance program should incorporate the conclusions listed in Section 9 of NUREG-1367, "Functional Capability of Piping Systems."[158]

3.0 TABLES

3.1 Table I summarizes the ~~requirements of this appendix for use with ASME Class 1, 2, and 3 components, component supports, and Class CS core support structures.~~guidance contained in this appendix.[159] The table illustrates plant events, system operating conditions, service loading combinations, and service stress limits and should always be used in conjunction with the text of this appendix.

3.2 Table II defines ~~all the~~[160] terms used in this appendix.

4.0 PROCEDURES FOR COMPLIANCE

4.1 Design Specification and Safety Analysis Report

(a) The design options provided by the Code and related design criteria specified in the Code required Design Specification for ASME Class 1, 2, and 3 components, component supports, and ~~Class CS~~[161] core support structures should be summarized in sufficient detail in the safety analysis report of the application to permit comparison with this appendix.

(b) The presentation in the PSAR should specify and account for all design and service loadings, method of combination, the designation of the appropriate design and service stress limits (including primary and secondary stresses, fatigue consideration, and special limits on pressure when appropriate) for each loading combination presented, and the provisions for functional capability.

(c) The presentation in the FSAR should indicate how the criteria in Sections 1 and 2 of this appendix have been implemented. Information regarding design certification review procedures and evaluation findings is offered in subsections III and IV of SRP Section 3.9.3.[162]

(d) The staff may request the submission of the Code-required[163] Design Documents such as Design Specifications, Design Reports, Load Capacity Data Sheets, or other related material or portions thereof, in order[164] to establish that the design criteria, the analytical methods, and functional capability satisfy the guidance provided by this appendix. This may include information provided to, and received from, component and support manufacturers. As an alternative to the applicant submitting these documents, the staff may require them to be made available for review at the applicant's or vendor's office.

4.2 Use with Regulatory Guides

~~The information and requirements contained in this appendix supersede those in the October 1973 version of Regulatory Guide 1.67 and the May 1973 version of Regulatory Guide 1.48.~~[165]Regulatory Guides 1.124 and 1.130 on Class 1 linear and Class 1 plate and shell component support structures are to be supplemented by this appendix.

TABLE I
Allowable Service Stress Limits for Specified Service Loading Combinations for
ASME Class 1, 2, and 3 Components and Component Supports, and ~~Class CS~~ Core[166] Support Structures

	Plant Event[2]	System Operating Conditions	Service Loading Combination[1,4]	Service Stress Limit
1.	Normal Operation	Normal	Sustained Loads	A
2.	Plant/System Operating Transients (SOT) + OBE	Upset	Sustained Loads + SOT + OBE	B[3]
3.	DBPB	Emergency	Sustained Loads + DBPB	C[3]
4.	MS/FWPB	Faulted	Sustained Loads + MS/FWPB	D[3]
5.	DBPB or MS/FWBP + SSE	Faulted	Sustained Loads + DBPB or MS/FWPB + SSE	D[3]
6.	LOCA	Faulted	Sustained Loads + LOCA	D[3]
7.	LOCA + SSE	Faulted	Sustained Loads + LOCA + SSE	D[3]

NOTE: [1]The appropriate method of combination is subject to review and evaluation. Refer to Section 1.2.

[2]Refer to Table II for definition of terms

[3]In addition to meeting the specified service stress limits for given load combinations, operability and functional capability must also be demonstrated as discussed in subsection 2.0 of this appendix and in SRP Section 3.10.

[4]These events must be considered in the pipe stress analysis and pipe support design process when specified in the ASME Code-required Design Specification. The Design Specification shall define the load and specify the applicable Code Service Stress Limit. For clarification, it should be noted that the potential for water hammer and water (steam) hammer occurrence should also be given proper consideration in the development of Design Specifications.

TABLE II

DEFINITION OF TERMS

Active Pumps and Valves - A pump or valve which must perform a mechanical motion in order to shut down the plant or mitigate the consequences of a postulated event. Safety and relief valves are specifically included.

Component and Support Functional Capability - Ability of a component, including its supports, to deliver rated flow and retain dimensional stability when the design and service loads, and their resulting stresses and strains, are at prescribed levels.

Component and Support Operability - Ability of an active component, including its support, to perform the mechanical motion required to fulfill its designated safety function when the design and service loads, and their resulting stresses and strains, are at prescribed levels.

DBPB - Design Basis Pipe Breaks - Those postulated pipe breaks other than a LOCA or MS/FWPB. This includes postulated pipe breaks in Class 1 branch lines that result in the loss of reactor coolant at a rate less than or equal to the capability of the reactor coolant makeup system.

This condition includes loads from the postulated pipe breaks, itself, and also any associated system transients or dynamic effects resulting from the postulated pipe break.

Design Limits - The limits for the design loadings provided in the appropriate subsection of Section III. Division 1, of the ASME Code.

Design Loads - Those pressures, temperatures, and mechanical loads selected as the basis for the design of a component.

Functional System - That configuration of components which, irrespective of ASME Code Class designation or combination of ASME Code Class designations, performs a particular function (i.e., each emergency core cooling system performs a single particular function and yet each may be comprised of some components which are ASME Class 1 and other components which are ASME Code Class 2).

LOCA - Loss-of-Coolant Accidents - Defined in Appendix A of 10 CFR Part 50 as "those postulated accidents that result from the loss of reactor coolant, at a rate in excess of the capability of the reactor coolant makeup system, from breaks in the reactor coolant pressure boundary, up to and including a break equivalent in size to the double-ended rupture of the largest pipe of the reactor coolant system."

This condition includes the loads from the postulated pipe break, itself, and also any associated system transients or dynamic effects resulting from the postulated pipe break.

MS/FWPB - Main Steam and Feedwater Pipe Breaks - Postulated breaks in the main steam and feedwater lines. For a BWR plant this may be considered as a LOCA event depending on the break location.

This condition includes the loads from the postulated pipe break, itself, and also any associated system transients or dynamic effects resulting from the postulated pipe break.

OBE - Operating Basis Earthquake - Defined in Section III (d) of Appendix A of 10 CFR Part 100 as "that earthquake which, considering the regional and local geology and seismology and specific characteristics of local subsurface material, could reasonably be expected to affect the plant site during the operating life of the plant. It is that earthquake which produces the vibratory ground motion for which those features of the nuclear power plant, necessary for continued operation without undue risk to the health and safety of the public, are designed to remain functional."

This condition includes the loads from the postulated seismic event, itself, and also any associated system transients or dynamic effects resulting from the postulated seismic event.

Piping Components - These items of a piping system such as tees, elbows, bends, pipe and tubing, and branch connections constructed in accordance with the rules of Section III of the ASME Code.

Postulated Events - Those postulated natural phenomena (i e., OBE, SSE) postulated site hazards (i.e., nearby explosion), or postulated plant events (i.e., DBPB, LOCA, MS/FWPB) for which the plant is designed to survive without undue risk to the health and safety of the public. Such postulated events may also be referred to as design basis events.

SSE - Safe Shutdown Earthquake - Defined in Section III(c) of Appendix A of 10 CFR Part 100 as that earthquake which is based upon an evaluation of the maximum earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material. It is the earthquake which produces the maximum vibratory ground motion for which certain structures, systems, and components are designed to remain functional. These structures, systems, and components are those necessary to ~~assure~~ensure:

(1) The integrity of the reactor coolant pressure boundary.

(2) The capability to shut down the reactor and maintain it in a safe shutdown condition, or

(3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline."

This condition includes the loads from the postulated seismic event, itself, and also any associated system transients or dynamic effects resulting from the postulated seismic event.

Service Limits - The four limits for the service loading as provided in the appropriate subsection of Section III, Division 1, of the ASME Code.

Service Loads - Those pressure, temperature, and mechanical loads provided in the Design Specification.

SOT - System Operating Transients - The transients and their resulting mechanical responses due to dynamic occurrences caused by plant or system operation.

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SRP Draft Section 3.9.3
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 primary review branch abbreviation	Changed primary review branch abbreviation from MEB to EMEB.
2.	Current primary review branch abbreviation	Changed primary review branch abbreviation from MEB to EMEB.
3.	SRP-UDP format item	Revised to include Reference 3 in the parentheses with "the Code".
4.	SRP-UDP format item	Deleted "(Reference 2)" in the sentence as regulations and GDCs are not identified by reference number in the text per SRP-UDP format.
5.	Editorial correction	Deleted "s" at the end of the word to correct case.
6.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "CS" in the sentence.
7.	Editorial modification	Deleted "This review" and substituted "The reviewer" at the beginning of the sentence to improve grammar.
8.	Editorial modification	Defined "SRP" as "Standard Review Plan."
9.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS" in the sentence.
10.	Editorial modification	Added "that occurs" in the sentence for clarification.
11.	Editorial modification	Substituted "postulated for" for "imposed on" in the sentence for clarification.
12.	Editorial modification	Substituted "include" for "identify" in the sentence for clarification.
13.	Editorial modification	Substituted "If" for "Where" in the sentence to improve grammar.
14.	Editorial correction	Changed "assure" to "ensure" to correct grammar. This correction will be made throughout the text of the SRP section without additional notations in this table.
15.	SRP-UDP format item	Added Review Interfaces subsection.
16.	Editorial modification	Changed "operability assurance" to "operability and seismic qualification program to more accurately characterize the scope of the reviews performed.

SRP Draft Section 3.9.3

Attachment A - Proposed Changes in Order of Occurrence

Item	Source	Description
17.	SRP-UDP format item	Moved paragraph from above. The primary review branch responsibility for SRP Section 3.10 is now the EMEB and the EMEB has primary review branch responsibility for SRP Section 3.9.3 as well. Therefore the paragraph was relocated as an EMEB review interface.
18.	Current primary review branch abbreviation	Changed primary review branch abbreviation from MEB to EMEB.
19.	SRP-UDP format item	Moved existing paragraph to just above the new Review Interfaces subsection.
20.	SRP-UDP format item	Divided existing text into subsections that refer to review interface branch responsibilities.
21.	SRP-UDP format item	Changed review interface branch designation to "Plant Systems Branch (SPLB) to reflect current primary review branch responsibility for SRP Section 10.3.
22.	SRP-UDP format item	Updated primary review branch abbreviation for SRP Section 5.2.2.
23.	**Integrated Impact 495,** Editorial	Added a review interface with new SRP Section 3.12 with regard to ISLOCA issues. Although this topic was discussed in Section 3.9.3 of the evolutionary plant FSERs, the review was performed by the Reactor Systems Branch (SRXB) and not the Mechanical Engineering Branch (EMEB) which is responsible for SRP Section 3.9.3. However, it is conceivable that the SRXB would coordinate their review of the interfacing system piping and component design with the EMEB, and thus the basis exists for the interface.
24.	**Integrated Impact 624**	Added review interface reflecting changes made to SRP Sections 5.4.7 and 6.3 per Revision Options Checklists 112 and 601 to address piping affected by thermal stratification, striping, oscillation, associated cyclic fatigue, etc.
25.	SRP-UDP format item	Updated primary review branch designation and abbreviation for SRP Section 6.2.1.2.
26.	Potential Impact 21826	Added a review interface reflecting a special topic of review that is relevant to SSC mechanical design adequacy.
27.	SRP-UDP format item	Revised to reflect standard end paragraph for review interfaces subsection so that interfaces to other EMEB reviews and with other PRBs can be acommodated.
28.	Editorial correction	Corrected citation of the regulations in the sentence.
29.	Editorial correction	Corrected case of the words in the sentence.

SRP Draft Section 3.9.3

Attachment A - Proposed Changes in Order of Occurrence

Item	Source	Description
30.	Editorial correction	Added required punctuation and missing word in the sentence.
31.	Editorial correction	Modified punctuation in the sentence for accuracy.
32.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS" in the sentence.
33.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS" in the sentence.
34.	Editorial correction	Changed word from "stations" to "installations" to correct what is believed to be a misprint. The description now conforms to the title of ASME Code Appendix O.
35.	Editorial correction	Changed "run pipe" to pipe run" in the sentence for clarification.
36.	Editorial correction	Changed "run pipe" to pipe run" in the sentence for clarification.
37.	Editorial modification	Substituted "should" for "must" in the sentence because it is appropriate to staff guidance relating to review of applicant's presentations.
38.	Editorial correction	Corrected subject of sentence from "plants" to "applicants."
39.	Editorial modification	Substituted "should" for "shall" in the sentence because it is appropriate to staff guidance relating to review of applicant's presentations.
40.	Integrated Impact Nos. 626 and 1348, PRB Comment	Added citation of subsection NF in accordance with the staff's acceptance of supports designed to the requirements of NF as described in subsection 3.9.3 of both the ABWR and CE80+ FSERs. Also retained citation of RGs 1.124 and 1.130 in response to PRB comments on earlier draft by another contractor.
41.	Editorial correction	Changed "operability assurance" to "operability and seismic qualification" in the sentence to more accurately characterize the scope of SRP Section 3.10.
42.	Editorial modification	Added phrase to the sentence to clarify that deformation limits are the subject of discussion.
43.	Editorial modification	Divided sentence in two and added introductory words at the beginning of the new sentence, for clarification.

SRP Draft Section 3.9.3
Attachment A - Proposed Changes in Order of Occurrence

Item	Source	Description
44.	Editorial correction	Changed "operability assurance" to "operability and seismic qualification" in the sentence to more accurately characterize the scope of SRP Section 3.10.
45.	Editorial modification	Added the word "equipment" to the sentence to clarify that the "allowable deformations" apply to the equipment rather than the supports.
46.	Editorial modification	Deleted redundant and potentially confusing phrase at the beginning of the sentence.
47.	Editorial modification	Deleted phrase and substituted another to improve sentence construction and clarify its meaning.
48.	Editorial modification	Placed numbered portions of the existing sentence on separate lines for clarification.
49.	Editorial modification	Placed numbered portions of the existing sentence on separate lines for clarification. Changed lower-case roman numerals to letters to avoid duplication in the subsection.
50.	Editorial correction	Revised words in the sentence to correct and clarify its meaning.
51.	Integrated Impact No. 626	Added the phrase "mismatch of end fitting clearances, mismatch of activation and release rates" to complete the sentence. Note that the rest of the paragraph agrees with this added text. The added text was taken from Item 2 of the Attachment to the NRC Memorandum from R. Baer to J. Norberg dated May 5, 1992, "Recommendations for SRP Revisions Related to Snubbers."
52.	Editorial correction	Modified sentence to correct the citations.
53.	**Integrated Impact 626**, Incorporation of PRB Comment	Added discussion of NRC requirements for dynamic qualification and testing of large bore hydrualic snubbers as recommended in NUREG/CR 5416 in response to a PRB comment.
54.	Editorial modification	Placed numbered portions of the existing sentence on separate lines for clarification.
55.	Editorial modification	Deleted misleading phrase from the sentence.
56.	Editorial modification	Deleted "his" to eliminate gender-specific reference (global change for this section).
57.	Editorial correction	Changed "and" to "are" to correct the sentence.
58.	Editorial modification	Modified sentence to clarify its meaning and correct grammar.

Item	Source	Description
59.	Editorial correction	Divided sentence into two parts to correct grammar and clarify meaning.
60.	Editorial correction	Added commas to define phrase in the sentence.
61.	Editorial modification	Deleted "installation" and substituted "snubbers" to clarify sentence.
62.	Editorial correction	Deleted redundant word.
63.	Editorial	Corrected Code subsection citation.
64.	Editorial modification	Placed numbered portions of the existing sentence on separate lines for clarification.
65.	SRP-UDP format item	Added "Technical Rationale" subsection.
66.	SRP-UDP format item	Added introductory sentence to Technical Rationale subsection.
67.	SRP-UDP format item	Added technical rationale for 10 CFR 50.55a.
68.	SRP-UDP format item	Added technical rationale for GDC 1.
69.	SRP-UDP format item	Added technical rationale for GDC 2.
70.	SRP-UDP format item	Added technical rationale for GDC 4.
71.	SRP-UDP format item	Added technical rationale for GDC 14.
72.	SRP-UDP format item	Added technical rationale for GDC 15.
73.	SRP-UDP format item	Added paragraph to describe the review procedures for design certification reviews.
74.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS" in the sentence.
75.	Editorial modification	Corrected sentence structure at the beginning of the sentence.
76.	Editorial modification	Corrected sentence structure in the body of the sentence.
77.	Editorial modification	Deleted meaningless phrase in the sentence.
78.	**Integrated Impact No. 496**	Added a discussion of the exemption in the evolutionary FSERs that allowed the elimination of the OBE from design considerations.
79.	Editorial modification	Modified wording in the sentence to clarify the subject.
80.	Editorial correction and modification	Changed "assure" to "ensure" to correct usage. Deleted redundant and confusing phrase in the sentence.

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Attachment A - Proposed Changes in Order of Occurrence

Item	Source	Description
81.	Editorial correction	Changed "whether" to "if" in the sentence to correct grammar.
82.	Editorial correction	Changed case of phrase from plural to singular to match previous sentence.
83.	Editorial correction	Changed case of phrase from plural to singular to match previous sentence.
84.	Editorial correction	Deleted the portion of the subsection that refers to ASME Code Case N-100. This code case is obsolete and the citation does not agree with the acceptance criteria offered in subsection II.2 that refers to ASME Appendix O.
85.	Editorial modification	Changed the words in the sentence to clarify that the sentence refers to subsections in this SRP section.
86.	Editorial modification	Cited the specific SRP subsections that are referred to in the sentence.
87.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard paragraph to address application of Review Procedures in design certification reviews.
88.	Editorial modification	Indented paragraph for clarification.
89.	Editorial correction	Corrected the citation of the regulations in the sentence.
90.	Editorial correction	Corrected the citation of the regulations in the sentence.
91.	SRP-UDP format item	Added applicability of General Design Criteria 14 and 15 to correct an apparent oversight.
92.	Editorial correction	Corrected spelling of "ensuring" here and in subsequent cases in the SRP section.
93.	Editorial correction	Added commas in the sentence to delimit phrases.
94.	Editorial modification	Corrected citation of regulation.
95.	Editorial correction	Corrected the citation of the regulations in the sentence.
96.	Integrated Impact No. 1348	Added citation of subsection NF of the Code.
97.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS components" and substituted "Core support structures" in the sentence.

Item	Source	Description
98.	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 relevant to the SRP section.
99.	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.
100.	SRP-UDP Guidance	Added standard paragraph to indicate applicability of this section to reviews of future applications.
101.	**Integrated Impact 624**, SRP-UDP format item, implementation of positions applicable to new (including evolutionary) plants.	Added standard information related to the implementation of actions specified in NRC Bulletins. Also added implementation information related to new positions added in Appendix A as applicable to new applications only.
102.	Editorial	Revised to reflect the addition of Bulletins containing implementation information and schedules as references.
103.	Editorial modification	Placed existing text for subreferences on separate lines.
104.	Editorial modification	Corrected title in the reference to agree with revised title of Appendix A.
105.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS" in the title.
106.	Editorial correction	Deleted inappropriate reference and substituted the correct one. This conforms to the acceptance criteria cited in subsection II.2 and the corrected review procedures cited in subsection III.2.a.
107.	Integrated Impact No. 499	Added NUREG-1367 as (revised numbering) Reference 9.
108.	**Integrated Impact 624**	Added reference listing for Bulletins cited in conjunctions with changes related to Integrated Impact 624 in Attachment A of this SRP Section.
109.	**Integrated Impact 626**, Incorporation of PRB Comment	Since citation of NUREG/CR-5416 was added for large bore snubber qualification and testing, the NUREG/CR was added as a reference.

SRP Draft Section 3.9.3

Attachment A - Proposed Changes in Order of Occurrence

Item	Source	Description
110.	Editorial modification	Deleted "OF SAFETY-RELATED SYSTEMS' in the title of Appendix A. This phrase is redundant and possibly misleading because the body of the SRP section does not refer to the subject components as safety-related or nonsafety-related and does not include guidance regarding the specific relationship between the subject components and safety-related systems.
111.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "CLASS CS" in the title.
112.	Editorial modification	Indented paragraphs in accordance with standard practice and to improve clarity.
113.	Editorial modification	Divided paragraph into two parts for clarification.
114.	**Integrated Impact 624**	Added discussion of conditions warranting special consideration in the design of affected piping and components such as thermal stratification, striping, and cycling based upon information on this subject provided in Bulletin 88-08 (and its supplements 1-3), Bulletin 88-11, and the ABWR and CE System 80+ FSERs.
115.	Editorial modification	Substituted "should" for "must" in the sentence because it is appropriate to staff guidance relating to review of applicant's presentations.
116.	Editorial modification	Divided the sentence into three short sentences and deleted redundant words in the last sentence.
117.	Editorial modification	Revised the end of the sentence for clarification.
118.	Editorial modification	Revised the beginning of the sentence for clarification.
119.	Editorial modification	Deleted "safety-related systems" and substituted "the subject components and structures" to more accurately describe the subject matter of the SRP section and Appendix A.
120.	Editorial	Added obvious missing letter.
121.	Editorial modification	Revised the beginning of the sentence to update wording.
122.	Editorial correction	Revised punctuation in the sentence.
123.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS" in the sentence.
124.	Editorial correction	Added missing words to correct typographical mistake.
125.	Editorial modification	Modified punctuation and added a phrase to clarify the sentence.

SRP Draft Section 3.9.3
Attachment A - Proposed Changes in Order of Occurrence

Item	Source	Description
126.	Editorial modification	Deleted obsolete and potentially confusing phrase at the beginning of the sentence.
127.	Primary review branch abbreviation	Changed "MEB" to "EMEB" in the sentence.
128.	Editorial, Incorporate PRB Comment	Deleted to provide consistency with other changes to eliminate explicit discussion of "safety-related" in this Appendix.
129.	Editorial correction	Corrected Table number from III to II.
130.	Editorial modification	Modified introductory sentence regarding the scope of the guidance in the appendix, for clarification.
131.	Editorial modification	Revised title of subsection 1.0 to eliminate citation of safety-related systems and to clarify that the subject is to provide guidance regarding the subjects listed directly above.
132.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "CLASS CS" in the title.
133.	Editorial modification	Corrected title to agree with that shown in subsection C.1.
134.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "class CS" in the sentence.
135.	Editorial correction	Deleted the phrase "in all respects" and substituted "as described in 10 CFR 50.55a" to correct the inaccurate statement.
136.	Editorial modification	Added the word "including" to the sentence to clarfiy the phrase in the context of the sentence.
137.	Editorial modification	Deleted redundant and confusing phrase in the sentence.
138.	**Integrated Impact 624**	Added information and staff positions applicable to current plants/applications regarding the effects of thermal stratification/oscillation on piping design.
139.	**Integrated Impact 624**	Added information and staff positions applicable to new plants/applications regarding the effects of thermal stratification/oscillation on piping design.

Item	Source	Description
140.	Integrated Impact Nos. 497, 623 and 624	Added a paragraph to describe the staff's position regarding fatigue evaluations and subsequent analyses of Class 1, 2, and 3 components and component supports, and core support structures. The second and third sentence also address the concern expressed in Integrated Impact No. 624 regarding review of thermal stresses. The last sentence of the added paragraph addresses the concern expressed in Integrated Impact No. 623 regarding environmental conditions having cumulative effects that could affect the margins in the ASME fatigue design curves. These positions were derived from the information in subsections 3.9.3 and 3.11 of the ABWR FSER (NUREG-1503) and the CE80+ FSER (NUREG-1462).
141.	Editorial correction	Added parentheses around the acronym "SOT".
142.	Editorial modification	Substituted "should" for "shall" in the sentence because it is appropriate to staff guidance relating to review of applicant's presentations.
143.	Editorial modification	Substituted "should" for "shall" in the sentence because it is appropriate to staff guidance relating to review of applicant's presentations.
144.	SRP-UDP format item	Deleted citation of reference number.
145.	Integrated Impact No. 496	Revised to cited alternatives and exemptions regarding OBE.
146.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS" in the sentence.
147.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS" in the sentence.
148.	Integrated Impact No. 496	Revised to cited alternatives and exemptions regarding OBE.
149.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS" in the sentence.
150.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS" in the sentence.
151.	Editorial modification	Substituted "should" for "shall" in the sentence because it is appropriate to staff guidance relating to review of applicant's presentations.
152.	SRP-UDP format item	Deleted "(Reference 10)" at the end of the sentence as unnecessary.

Item	Source	Description
153.	Editorial modification	Divided the sentence in two and inserted words and phrases to improve grammar, clarify the meaning, and improve the accuracy of the statements in the sentences.
154.	Editorial modification	Substituted "should" for "shall" in the sentence because it is appropriate to staff guidance relating to review of applicant's presentations.
155.	Editorial modification	Substituted "should" for "shall" in the sentence because it is appropriate to staff guidance relating to review of applicant's presentations.
156.	Editorial modification	Substituted "should" for "shall" in the sentence because it is appropriate to staff guidance relating to review of applicant's presentations.
157.	Editorial modification	Substituted "should be used by applicants to" for "shall" in the sentence to improve grammar and because "should" is appropriate to staff guidance relating to review of applicant's presentations.
158.	Integrated Impact No. 499	Added sentence to refer to NUREG-1367 which includes staff conclusions (positions) regarding functional capability of piping systems.
159.	Editorial modification	Deleted redundant phrase in the sentence and characterized the contents of Appendix A as guidance rather than requirements. This conforms to the second paragraph of the POSITION subsection of this appendix.
160.	Editorial modification	Deleted the phrase "all the" in the sentence for accuracy.
161.	Editorial correction	Deleted non-standard (not in accordance with the ASME Code) nomenclature. Deleted "Class CS" in the sentence.
162.	Editorial modification SRP-UDP format item	Added sentence covering use of the Appendix in design certification reviews that refers to the guidance in the text of SRP Section 3.9.3.
163.	Editorial correction	Hyphenated word to correct the meaning in the sentence.
164.	Editorial modification	Added phrase "in order to" to the sentence for clarification.
165.	Editorial correction	Deleted sentence that refers to superseding RGs 1.48 and 1.67. These RGs were withdrawn in 1985 and 1983 respectively, therefore, the sentence is no longer needed.

Item	Source	Description
166.	Editorial correction	Corrected title of Table 1 to include omitted words. Deleted non-standard (not in accordance with the ASME Code) nomenclature, i.e., "Class CS" in the title.

SRP Draft Section 3.9.3
Attachment B - Cross Reference of Integrated Impacts

Integrated Impact No.	Issue	SRP Subsections Affected
495	Interfacing system LOCA protection.	Subsection 1 Review Interface B
496	Eliminate citations of the OBE in the SRP section.	Subsection III.1 Appendix A, Subsection C.1.2, C.1.3.2
497	Fatigue damage to the subject components and supports. See Integrated Impact No. 623 and 624.	Appendix A, Subsection C.1.1
498	Leak-before-break design considerations.	Make no change to SRP Section 3.9.3 or its Appendix A based on this integrated impact statement. The SRP section is in agreement with the current staff position.
499	Functional Capability of Piping systems	REFERENCES Added Reference 11 Appendix A Subsection C.2.3
500	Add review procedures for concrete expansion anchors.	Make no change to SRP Section 3.9.3 or its Appendix A based on this integrated impact statement. Integrated Impact No. 500 is incorrectly assigned to SRP Section 3.9.3.
501	Add a Review Procedure for structural integrity of safety-related HVAC ductwork.	Make no change to SRP Section 3.9.3 or its Appendix A based on this integrated impact statement. Integrated Impact No. 501 is not applicable to SRP Section 3.9.3.
623	Fatigue damage to the subject components and supports. See Integrated Impact Nos. 497 and 624.	Appendix A, Subsection C.1.1
624	Consideration of thermal effects See Integrated Impact Nos. 497 and 623.	Appendix A, Subsection C.1.1
625	Jurisdictional boundaries between component supports and structures	Make no change to SRP Section 3.9.3. The 1989 edition of the ASME Code will be applied to all future plants as described in 10 CFR 50.55a(b). The 1989 version of subsection NF of the ASME Code clearly defines the jurisdictional boundaries between structures and component supports. There is no need to revise the text in SRP Section 3.9.3.

626	Acceptance criteria for snubbers	Subsection II.3 Subsection VI.14
1225	Revise the SRP to incorporate the new and revised requirements from proposed rulemaking 59 FR 52255 amending 10 CFR 50 and 10 CFR 100 with regard to source term and dose considerations, and seismic and earthquake considerations related to reactor siting.	Not processed
1332	Revise the SRP to incorporate the guidance contained in draft regulatory guide SC 708-4, "Qualification and Acceptance Tests for Snubbers used in Systems Important to Safety."	Not processed
1348	Acceptance criteria for component supports	Subsection II.3 Subsection IV.3