

April 30, 2007

MEMORANDUM TO: George A. Wilson, Branch Chief
Electrical Engineering Branch
Division of Engineering
Office of Nuclear Reactor Regulation

FROM: Nitin Patel **/RA/**
Electrical Engineering Branch
Division of Engineering
Office of Nuclear Reactor Regulation

SUBJECT: RESOLUTION OF THE INDUSTRY COMMENTS FROM
NUCLEAR UTILITY GROUP EQUIPMENT QUALIFICATION ON
PROPOSED REVISION TO STANDARD REVIEW PLAN
(SECTION 3.11, "ENVIRONMENTAL QUALIFICATION OF
MECHANICAL AND ELECTRICAL EQUIPMENT"
(TAC NO MD1887)

The Electrical Engineering Branch has reviewed the comments provided by the industry group Nuclear Utility Group Equipment Qualification (NUGEQ) by letter dated February 09, 2007 on Standard Review Plan (SRP) 3.11. The SRP 3.11 was revised to incorporate the appropriate NUGEQ comments and issued on March 28, 2007 (ML063600397). The Resolution of NUGEQ comments is provided in the enclosure.

Enclosure: As stated

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Resolution of NUGEQ Comments on SRP Section 3.11, Rev. 3, 2007 (ML062180004)
Prepared April 04, 2007

No.	NUGEQ Comment	NUGEQ Recommended Change	NRC Staff Resolution	Changes Made to SRP 3.11
I.	<p>Progressive Deterioration of SRP 3.11 Guidance</p> <p>The NUGEQ after careful review has concluded that both the 1996 and the recent (2006) drafts of SRP 3.11 represent a progressive deterioration with respect to establishing clear, concise, unambiguous guidance to applicants and reviewers that is both internally consistent and consistent with other regulatory (e.g., SRP and regulatory guide) guidance. We question the ability of the SRP 3.11 2006 proposed revision ("Proposed Revision") to support an efficient, effective, stable regulatory review process in that it fails to adequately reflect either current practice or to appropriately and clearly address consideration of new or revised standards. The comments herein address many of the problems with this SRP. However, one major difficulty with the existing SRP is inadequate guidance regarding the fundamental regulatory basis for this SRP section and its failure to clearly identify major differences in expectations among the various classes of affected equipment (i.e., harsh environment electrical, harsh environment mechanical, and mild environment electrical and mechanical).</p> <p>SRP 3.11 1981 clearly and appropriately makes an introductory, high level statement that the information presented in SAR Section 3.11 and reviewed by the NRC is intended to assure conformance with General Design Criterion (GDC) 4. The subsequent revisions obfuscate this high level propose by hiding GDC 4 and 10</p>	<p>1) The NUGEQ recommends selective changes to the SRP 3.11 introductory language to help frame the guidance in subsequent sections. This change does not resolve problems with other confusing and contradictory language, but it should help applicants and reviewers to place subsequent language in perspective. Replace the second paragraph in I. AREAS OF REVIEW with the following.</p> <p>"The review will be performed to assure conformance with the environmental design basis requirements of 10 CFR Part 50, Appendix A, General Design Criterion 4 which states, in part, that "Structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents." The review will assure conformance with the applicable portions of other relevant regulations, including 10 CFR 50.67, 10 CFR Part 50, Appendix A, General</p>	<p>1) Agree</p> <p>The comment was incorporated with minor rewording and GDC 2 was added for reasons provided in response to comment no. II</p>	<p>1) The 2nd paragraph of Section I AREAS OF REVIEW revised to read as follows:</p> <p>"The review will be performed to assure conformance with the environmental design basis requirements of 10 CFR Part 50, Appendix A, General Design Criterion 4 which states, in part, that "Structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents." The review will assure conformance with the applicable portions of other relevant regulations, including 10 CFR Part 50, Appendix A, General Design Criteria 1, 2 and 23; 10 CFR Part 50, and Appendix B, Quality Assurance Criteria III, XI, and XVII. The review</p>

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	<p>CFR 50.49 in a list of other applicable but secondary (with respect to environmental qualification) regulations (e.g., GDC 1, 2, 4, and 23; and Appendix B, Quality Assurance Criteria III, XI, and XVII). This obfuscation is compounded in the 2006 draft that adds a significant amount of redundant, unnecessary, and often incorrect verbiage regarding compliance with each of these individual regulations. See for example the generally unhelpful new information provided in "Technical Rationale" beginning on page 3.11-12. Specific information regarding the confusing guidance associated with GDC 2 is provided in our comment - Qualification for Natural Phenomena – (GDC 2).</p> <p>Similarly, revisions subsequent to 1981 confuse the significant differences in regulatory requirements and expectations regarding the methodologies and documentation used to establish GDC 4 compliance for different equipment classes (i.e., harsh environment electrical, harsh environment mechanical, and mild environment electrical and mechanical). The 1981 version attempted to address these important distinctions by establishing two major subsections, Harsh Environment and Mild Environment, in SRP 3.11, Section II, Acceptance Criteria. The current version has eliminated these important subsections and hides these important differences in a few items (e.g., #18 and #19) within a larger list of 22 items.</p>	<p>Design Criteria 1 and 23; 10 CFR Part 50, and Appendix B, Quality Assurance Criteria III, XI, and XVII. The review also assures conformance to Section 50.49 of 10 CFR which contains specific requirements regarding the environmental qualification of electrical equipment important to safety that is located in a harsh environment. For mechanical equipment located in a harsh environment, compliance with the environmental provisions of GDC 4 is generally achieved by demonstrating that the non-metallic parts/components are suitable for the postulated environmental conditions. For electrical and mechanical devices located in mild environments, compliance with the environmental provisions of GDC 4 is generally achieved and demonstrated by proper incorporation of all relevant environmental conditions into the design process, including the equipment specification. Reviews to determine compliance with related requirements for (1) dynamic and seismic qualification of electrical and mechanical equipment, (2) protection of electric and mechanical equipment against other natural phenomena and external events, (3) functional qualification of mechanical equipment, (4) equipment</p>		<p>also assures conformance to Section 50.49 of 10 CFR which contains specific requirements regarding the environmental qualification of electrical equipment important to safety that is located in a harsh environment.</p> <p>For mechanical equipment located in a harsh environment, compliance with the environmental provisions of GDC 4 is generally achieved by demonstrating that the non-metallic parts/components are suitable for the postulated design basis environmental conditions.</p> <p>For electrical and mechanical devices located in mild environments, compliance with the environmental provisions of GDC 4 is generally achieved and demonstrated by proper incorporation of all relevant environmental conditions into the design process, including the equipment specification.</p> <p>Reviews to determine compliance with related</p>

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		survivability for beyond design basis hydrogen burns, and (5) qualification of digital instrumentation and control equipment are described in other SRP sections.”		requirements for (1) dynamic and seismic qualification of electrical and mechanical equipment, (2) protection of electric and mechanical equipment against other natural phenomena and external events, (3) functional qualification of mechanical equipment, (4) equipment survivability for beyond design basis hydrogen burns, and (5) qualification of digital instrumentation and control equipment located in mild environment are described in other SRP sections.”
II	<p>Qualification for Natural Phenomena - (GDC 2)</p> <p>Proposed SRP 3.11 appears to contain numerous examples of confusing and contradictory guidance. Time constraints prevent a thorough review of this SRP section and its relationship to other SRP sections and SRP review activities. However, SRP 3.11 guidance on qualification for natural phenomena provides insight and one example of such confusion.</p> <p>According to SRP 3.11 - “Protection of mechanical and electrical equipment against other natural phenomena and external events is addressed in other SRP sections, as described under Review Interfaces in this subsection.” (emphasis added) (pg 3.11-3) (The NUGEQ notes that “other” is undefined and can only be</p>	<p>1) NUGEQ agrees with the pg 3.11-3 statement that “Protection of mechanical and electrical equipment against other natural phenomena and external events is addressed in other SRP sections.”</p> <p>The other SRP 3.11 text related to GDC 2 should be deleted as misleading. This includes the following: page 3.11-5 item #5; 3.11-13 item #5; and 3.11-19 in item #4.</p>	<p>1) Disagree</p> <p>The Environmental Qualification Rule, 10 CFR 50.49, (b)(ii) addresses natural phenomena and states the following:</p> <p>“(ii) Design basis events are defined as conditions of normal operation, including anticipated operational occurrences, design basis accidents, external events, and natural phenomena for which the plant must be</p>	<p>1) No changes made based on this comment.</p>

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	<p>understood by carefully reviewing changes from draft 1996 version. In that version the prior sentence – now deleted – discusses seismic and dynamic qualification. So “other” means - other than seismic and dynamic. However, the only natural phenomena or external event currently identified in Review Interfaces is a reference to SRP 3.10 for seismic and dynamic qualification. “Other” natural phenomena are not discussed.</p> <p>The design basis for protection against natural phenomena - GDC 2 - indicates that natural phenomena include earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches. It also requires component designs to consider appropriate combinations of normal/accident conditions with natural phenomena effects. A number of SPR sections relate to natural phenomena, including 3.3.1 Wind Loadings, 3.3.2 Tornado Loadings, 3.4.1 Flood Protection, and 3.5.1.4 Missiles Generated by Natural Phenomena. In contrast even the 1996 draft SRP 3.11 identifies SPR sections relate to natural phenomena as including 3.4.1, 3.5.1.1, 3.5.2, 3.6.1, and 5.4.11.</p> <p>Since SRP 3.11 appropriately states that other SRP sections address natural phenomena one would conclude that SRP 3.11 would not contain related acceptance criteria. Unfortunately, SRP 3.11 Section II ACCEPTANCE CRITERIA specifically cites - 10 CFR Part 50, Appendix A, General Design Criterion 2, “Design Bases for Protection Against Natural Phenomena.” (pg 3.11-3) Further acceptance criteria amplification is provided under SRP Acceptance Criteria Technical Rationale which states in Item 5 (this is all new language not contained in 1996 version):</p>	<p>2) This is a simplified and slightly distorted (it includes “i.e., environmental qualification” that is not in GDC 2) version of the GDC 2 text without the phenomena examples - earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches</p>	<p>designed to ensure functions (b)(1)(I) (A) through © of this section.”</p> <p>In addition, GDC 2 is mentioned in RG 1.89, Revision 1. Therefore, the staff considers GDC 2 an appropriate reference for SRP 3.11.</p> <p>2) Agree</p> <p>Removed “(i.e., environmental qualification)”</p>	<p>2) Technical rationale, Item 4 revised to read as follows:</p> <p>GDC 2, ‘Design Bases for Protection Against Natural Phenomena,’ requires that components important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety function.</p> <p>GDC 2 is applicable to this section since the design bases for components important to safety must consider the effects of the most severe natural phenomena anticipated for the site, together with normal and accident plant operating</p>

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	<p>“Compliance with 10 CFR Part 50, Appendix A, General Design Criterion 2 (GDC 2), “Design Bases for Protection Against Natural Phenomena,” requires that components important to safety be designed to withstand the effects of natural phenomena without loss of capability to perform their safety function. The design bases for these components must consider the effects of the most severe natural phenomena anticipated for the site, together with normal and accident plant operating conditions (i.e., environmental qualification) and the importance of the safety function to be performed.”</p> <p>This is a simplified and slightly distorted (it includes “i.e., environmental qualification” that is not in GDC 2) version of the GDC 2 text without the phenomena examples - earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches. The new SRP 3.11 text then states:</p> <p>“Equipment important to safety must be able to perform their design safety functions under all anticipated operating conditions, which includes normal environmental conditions, anticipated operational occurrences, and accident and post-accident environmental conditions. The environmental qualification process described by the various documents, regulations, regulatory guides, and industry standards cited in Subsection II of this SRP section provides a method of demonstrating that equipment will be able to perform acceptably during all anticipated operating conditions, even after being degraded due to exposure to service conditions during its qualified life. Meeting GDC 2 provides assurance that appropriate combinations of the effects of</p>	<p>3) The NUGEQ also suggests the addition of clarifying text under Review Interfaces to make clear that protection of mechanical and electrical equipment against other natural phenomena and external events is addressed in other subsections of SRP Section 3. This text could be incorporated into item #1 on page 3.11-3 or provided as a new item.</p>	<p>3) Agree</p>	<p>conditions and the importance of the safety function to be performed. Components in the scope of this section that are subject to environmental design and qualification must consider natural phenomena as part of the environmental conditions evaluated.</p> <p>Meeting GDC-2 provides assurance that appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena are considered in meeting the environmental design and qualification requirements.”</p> <p>3) The following text incorporated in Review Interfaces Item 10 C:</p> <p>“The design bases for protection of mechanical and electrical equipment against natural phenomena and external events, are reviewed under appropriate subsections of SRP Section 3 (e.g., 3.3.1, 3.3.2, 3.4.1,</p>

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	<p>normal and accident conditions with the effects of the natural phenomena are considered in the environmental qualification process.”</p> <p>The only reference here to natural phenomena and GDC 2 involves the “combination” of effects. The NUGEQ is unaware – absent a detailed review – of any further guidance in “the various documents, regulations, regulatory guides, and industry standards cited in Subsection II” related to such natural phenomena (except seismic) or the combination of such phenomena with plant environmental conditions. The NUGEQ believes that compliance with GDC 2 is achieved by integrating its requirements into the design of the plant and affected SSCs and this is adequately addressed in other SRP sections. If the plant design does not adequately protect the equipment from such natural phenomena then the equipment could be qualified for the anticipated environmental conditions.</p> <p>In summary, the NUGEQ agrees with the pg 3.11-3 statement that “Protection of mechanical and electrical equipment against other natural phenomena and external events is addressed in other SRP sections.” The other SRP 3.11 text related to GDC 2 should be deleted as misleading. This includes the following: page 3.11-5 item #5; 3.11-13 item #5; and 3.11-19 in item #4. The NUGEQ also suggests the addition of clarifying text under Review Interfaces to make clear that protection of mechanical and electrical equipment against other natural phenomena and external events is addressed in other subsections of SRP Section 3. This text could be incorporated into item #1 on page 3.11-3 or provided as a new item.</p>			<p>3.5.1.1, 3.5.1.4, 3.5.1.5, and 3.5.2). SRP Section 3.10 includes seismic and dynamic qualification of mechanical and electrical equipment.”</p>

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III	<p>Qualification for Combustible Gas Control</p> <p>Proposed SRP 3.11 in numerous locations erroneously references 10 CFR 50.34 (f)(2)(ix) as the regulatory basis for combustible gas control requirements for future reactors. The appropriate regulatory basis is 10 CFR 50.44©.</p> <p>SRP 3.11 also erroneously indicates in Specific Acceptance Criterion #17 (page 3.11- 10) that – “The environmental qualification program must ensure that equipment that is necessary for achieving and maintaining safe shutdown of the plant, and maintaining containment integrity, will perform its safety function during and after being exposed to the environmental conditions resulting from the release of hydrogen generated by the equivalent of a 100% fuel-clad metal-water reaction” The 50.44 rulemaking makes clear that its Equipment Survivability language, for existing plants in 50.44(b)(3) and future plants in 50.44(c)(3), does not apply environmental qualification criteria and does not require compliance with § 50.49 where standards for the environmental qualification program are established. Specifically -</p> <p>SECY-03-0127, “FINAL RULEMAKING — RISK-INFORMED 10 CFR 50.44, “COMBUSTIBLE GAS CONTROL IN CONTAINMENT” states that:</p> <p>“The NRC’s requirements for future reactors previously specified in §50.34(f)(2)(ix) have been reworded for conciseness but without material change and relocated to §50.44(c)(2) to consolidate the combustible gas control requirements in §50.44 for easier reference.”</p>	<p>The following changes to SRP 3.11 are recommended in order to make clear that (1) qualification to § 50.49 is not required for beyond design basis accident environments and the associated hydrogen generation and (2) the applicable hydrogen control regulatory basis for new plants is 50.44 and not 50.34.</p> <p>1) Delete reference to 50.34(f)(2)(ix) on 3.11-1</p> <p>2) Delete all of ACCEPTANCE CRITERIA #1 on 3.11 -5,</p> <p>3) Delete all of item #17 on 3.11-10,</p> <p>4) Delete all of item #1 on 3.11-12,</p> <p>5) Delete two references to 50.34 on 3.11-18 (1st paragraph and in COL paragraph), and</p> <p>6) Delete all of REFERENCE #1 on 3.11-19.</p> <p>7) Add a new item under Review Interfaces which reads as follows:</p> <p>“Review of equipment functional performance during and after being exposed to the environmental conditions resulting from the release of hydrogen</p>	<p>1)Agree</p> <p>2) Agree</p> <p>3) Agree</p> <p>4)Agree</p> <p>5) Agree</p> <p>6) Agree</p> <p>7) Agree</p>	<p>1) Recommended deletion made.</p> <p>2) Recommended deletion made.</p> <p>3) Recommended deletion made.</p> <p>4) Recommended deletion made.</p> <p>5) Recommended deletion made.</p> <p>6) Recommended deletion made.</p> <p>7) Recommended addition incorporated as a new item under Review Interfaces item 11.</p>

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	<p>(SECY page 20)</p> <p>The SECY discussion further clarifies that systems, structures, and components provided to meet the provisions of 50.44(c)(2) are intended to meet a survivability standard and not qualification.¹ Specifically, "Structures, systems, and components (SSCs) provided to meet this requirement must be designed to provide reasonable assurance that they will operate in the severe accident environment for which they are intended and over the time span for which they are needed. Equipment survivability expectations under severe accident conditions should consider the circumstances of applicable initiating events (such as station blackout or earthquakes) and the environment (including pressure, temperature, and radiation) in which the equipment is relied upon to function." Also, "Because these requirements address beyond designbasis combustible gas control, SSCs provided to meet these requirements need not be subject to the environmental qualification requirements of § 50.49; quality assurance requirements of 10 CFR Part 50, Appendix B; and redundancy/diversity requirements of 10 CFR Part 50, Appendix A." And finally, "Guidance such as that found in Appendices A and B of RG 1.155, "Station Blackout," is appropriate for equipment used to mitigate the consequences of severe accidents." (SECY page 54)</p>	<p>generated by the equivalent of a 100% fuel-clad metal-water reaction, as stated in 10 CFR 50.44©, is performed in SRP Section 6.2.5."</p> <p>8) We also recommend that the version of SRP 6.2.5 provided as Attachment 6 to SECY- 03-0127 be modified to make clearer that a survivability standard and not compliance with 10 CFR 50.49 is used to establish reasonable assurance of operability of SSCs. This can be accomplished by deleting in three locations the words "qualification test" or "qualification program" and replacing with "test" or "program" as appropriate. Additional SRP 6.2.5 guidance may also be appropriate to accurately reflect the provisions of § 50.44 and the information in SECY-03-0127. Suggested text could include the following:</p> <p>"Structures, systems, and components (SSCs) provided to meet 50.44© must be designed to provide reasonable assurance that they will operate in the severe accident environment for which they are intended and over the time span for which they are needed. Equipment survivability expectations under severe accident conditions should</p>	<p>8) Disagree</p> <p>This is beyond the scope of SRP 3.11. Refer to RG 1.7 "Control of Combustible Gas Concentrations in Containment"</p>	<p>8) No changes made as a result of this comment.</p>

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		<p>consider the circumstances of applicable initiating events (such as station blackout or earthquakes) and the environment (including pressure, temperature, and radiation) in which the equipment is relied upon to function. Because these requirements address beyond design-basis combustible gas control, SSCs provided to meet these requirements need not be subject to the environmental qualification requirements of § 50.49; quality assurance requirements of 10 CFR Part 50, Appendix B; and redundancy/diversity requirements of 10 CFR Part 50, Appendix A. Guidance such as that found in Appendices A and B of RG 1.155, "Station Blackout," is appropriate for equipment used to mitigate the consequences of severe accidents."</p>		
IV	<p>Definition of Environmental Qualification</p> <p>Item 2 page 3.11-2 states: "Section 3.11 of the SAR is reviewed to determine whether the required environmental qualification of all equipment important to safety will be, or has been adequately demonstrated. The term "environmental qualification" means verification of design, limited to demonstrating that electrical or</p>	<p>The NUGEQ recommends the following changes to SRP 3.11 to properly characterize these differences for harsh and mild equipment and environmental design and environmental qualification.</p> <p>1) Revise Item 2 page 3.11-2 to</p>	<p>1) Agree</p>	<p>1) The following text added</p>

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	<p>mechanical or digital instrumentation and control equipment are capable of performing their safety function under significant environmental stresses resulting from design basis events in order to avoid common-cause failure." This text is based on similar language in Regulatory Guide 1.89 Rev. 1 which is limited to electrical equipment in harsh environments. Although this SRP statement is generally appropriate for electrical and mechanical equipment in a harsh environment, it is not appropriate for electrical or mechanical equipment in mild environments. In addition, SRP 3.11 expands this language to include "all equipment important to safety."</p> <p>Regarding mild environment equipment the statement is incorrect since (1) there are no significant environmental stresses resulting from design basis events (e.g., LOCA) for equipment in a mild environment, (2) environmental qualification for mild environment equipment and compliance with GDC 4 is generally achieved and demonstrated by proper incorporation of all relevant environmental conditions into the design process, including the equipment specification, and (3) the avoidance of environmentally-induced common-cause failures is critical for harsh conditions but is not relevant for mild environment conditions.</p> <p>The Commission in CLI-80-21 stated that "fundamental to NRC regulation of nuclear power reactors is the principle that safety systems must perform their intended function in spite of the environment which may result from postulated accidents. Confirmation that these systems will remain functional under postulated accident conditions constitutes environmental</p>	<p>read: "Section 3.11 of the SAR is reviewed to determine whether the required environmental design and qualification of all equipment important to safety will be, or has been adequately demonstrated. The term "environmental qualification" means verification of design, limited to demonstrating that electrical or mechanical or instrumentation and control equipment are capable of performing their safety function under significant environmental stresses resulting from design basis events (i.e., harsh environments) in order to avoid common-cause failure. Environmental design requirements apply to all equipment important to safety."</p> <p>2) Page 3.11-6 paragraph beginning "The general requirements . . .": Revise phrase (2) to read as follows: "(2) the environmental qualification of equipment located in a harsh environment shall be demonstrated by appropriate</p>	<p>2) Agree</p>	<p>to Areas of Review Item 2:</p> <p>"Section 3.11 of the SAR is reviewed to determine whether the required environmental design and qualification of all equipment important to safety will be, or has been adequately demonstrated. The term "environmental qualification" means verification of design, limited to demonstrating that electrical or mechanical or instrumentation and control equipment are capable of performing their safety function under significant environmental stresses (i.e., harsh environments) resulting from design basis events in order to avoid common-cause failure. Environmental design requirements apply to all equipment important to safety. (i.e., both mild and harsh environments)."</p> <p>2) Item (2) in the paragraph on page 3.11-6 beginning "The general requirements..." reworded as follows:</p> <p>"(2) the environmental qualification of equipment located in harsh environment</p>

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	<p>qualification.2 (emphasis added) This perspective was reaffirmed by the Commission in its Statement of Policy on Environmental Qualification.3 The policy further states that “This principle is incorporated in the Commission’s existing General Design Criteria One and Four 10 CFR Part 50, Appendix A.”</p> <p>Based on these Commission statements and related technical considerations, including the use of tests and analysis to demonstrate compliance, the NUGEQ concludes that the term “environmental qualification” is appropriately limited to equipment that must function under accident environmental conditions and should not be applied to equipment in mild environments. For mild environment equipment it is more appropriate to state that the equipment per GDC-4 is designed to accommodate and be compatible with postulated environmental conditions and not use the terms “environmental qualification” or “environmental qualification program” for mild environment equipment.</p> <p>The NUGEQ recommends the following changes to SRP 3.11 to properly characterize these differences for harsh and mild equipment and environmental design and environmental qualification.</p> <p>Revise Item 2 page 3.11-2 to read: “Section 3.11 of the SAR is reviewed to determine whether the required environmental design and qualification of all equipment important to safety will be, or has been adequately demonstrated. The term “environmental qualification” means verification of design, limited to demonstrating that electrical or mechanical or instrumentation and control</p>	<p>testing and analyses; and . . .”</p> <p>3)Delete last sentence. Alternatively revise to differentiate between environmental design (for all equipment) and environmental qualification (harsh environment equipment only).</p>	<p>3) Disagree</p> <p>In response to comment 2 above, the revised wording in Item (2) in the paragraph on page 3.11-6 beginning “The general requirements...” makes clear the differentiation between environmental design (for all equipment) and environmental qualification (harsh environment equipment only). No further changes needed.</p>	<p>shall be demonstrated by appropriate testing and analyses;”</p> <p>3) No changes made based on this comment.</p>

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	<p>equipment are capable of performing their safety function under significant environmental stresses resulting from design basis events (i.e., harsh environments) in order to avoid common-cause failure. Environmental design requirements apply to all equipment important to safety.”</p> <p>Page 3.11-16 paragraph beginning “The general requirements . . .”: Revise phrase (2) to read as follows: “(2) the environmental qualification of equipment located in a harsh environment shall be demonstrated by appropriate testing and analyses; and . . .” Delete last sentence. Alternatively revise to differentiate between environmental design (for all equipment) and environmental qualification (hash environment equipment only).</p>			
V.	<p>Confusing use of the term - Environmental Qualification Program</p> <p>The proposed SRP 3.11, in particularly the new text, lavishly uses the term “environmental qualification program”. The NUGEQ believes the excessive use of this term contributes to confusing SRP 3.11 guidance.4 The term “environmental qualification program” is most appropriately applied to the program required by 10 CFR 50.49. The term should not be used to represent those other activities described in SRP 3.11 that are used to demonstrate that mechanical and electrical equipment are designed to be compatible with and accommodate the effects of applicable environmental conditions not associated with harsh environments. These activities are integral to the design process and associated documentation and do not represent an ongoing</p>	<p>The NUGEQ recommends that</p> <p>1) SRP 3.11 be revised to limit use of the term “environmental qualification program” to activities associated with 10 CFR 50.49 compliance. The term “environmental qualification” should replace “environmental qualification program” if the activities are associated with qualification of mechanical and electrical equipment located in a harsh environment.</p> <p>2) For equipment in a mild environment neither “environmental qualification” nor “environmental qualification program” should be used; the</p>	<p>1) Agree</p> <p>2) Agree</p>	<p>1) Appropriate revisions made to use the term “environmental qualification” to refer to activities associated with equipment located in a harsh environment, and the term “environmental design” to refer to activities associated with equipment located in a mild environment.</p> <p>2) Appropriate changes made to use the term “environmental design” to refer to activities associated with equipment in a mild</p>

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	<p>program. Of course, regulations applicable to design and the design process assure that the requirements apply, as appropriate, to equipment modifications or replacement.</p>	<p>appropriate term for this mild environment equipment would be "design" or "environmental design". The most appropriate term for all the activities addressed by SRP 3.11 would be "environmental design and qualification."</p>		<p>environment.</p>
VI	<p>References to NUREG-0588</p> <p>Page 3.11-6 describes NUREG-0588 and references its endorsement by CLI 80-21. While the endorsement by CLI 80-21 has some historical significance this memorandum and order was effectively superseded by the issuance of 10 CFR 50.49. Further, the information contained in NUREG-0588 Rev. 1, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment" was formally identified as interim guidance. The NUREG abstract states that these interim positions will be used "until the final positions, currently being developed in rulemaking, are established." A review 10 CFR 50.49 and the accompanying statements of consideration indicates that the rule grandfathered and limited the applicability of certain documents to existing plants in 50.49(k) (i.e., plants previously required by the Commission to qualify equipment in accordance with the DOR Guidelines or NUREG-0588 (for comment version) need not qualify the equipment to 50.49). Consequently, qualification for future plants is based on 50.49 and not on NUREG-0588.</p> <p>The use of NUREG-0588 as staff guidance was also superseded by the issuance of Regulatory Guide 1.89 Rev. 1, June 1984, which describes a</p>	<p>Given these considerations we recommend the following changes to SRP 3.11:</p> <p>1) Delete ACCEPTANCE CRITERIA item #1 in its entirety (page 3.11-6). Alternatively move the NUREG-0588 discussion to a less prominent location (e.g., after discussing Regulatory Guide 1.89) and revise to read as follows:</p> <p>"NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety- Related Electrical Equipment," Revision 1, July 1981 provides general information applicable to existing plants that may be useful for assessing the compliance of an environmental qualification program with 10 CFR 50.49. For future plants Regulatory Guide 1.89 provides the principal guidance for implementing the requirements and criteria of 10 CFR 50.49 for environmental qualification of electrical equipment that is important to safety and located in a harsh</p>	<p>1) Agree</p>	<p>1) Item 1 of SRP Acceptance Criteria revised to read as follows:</p> <p>"NUREG-0588, 'Interim Staff Position on Environmental Qualification of Safety Related Electrical Equipment,' Revision 1, July 1981 provides staff positions applicable to existing plants for assessing the compliance of an environmental qualification program with 10 CFR 50.49. For future plants, Regulatory Guide 1.89 provides the principal guidance for implementing the requirements and criteria of 10 CFR 50.49 for environmental qualification of electrical equipment that is important to safety and located in a harsh environment. However, certain NUREG-0588</p>

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	<p>method acceptable to the NRC staff for complying with 10 CFR50.49 with regard to qualification of electric equipment important to safety. A review of Regulatory Guide 1.89 Rev. 1 indicates that the guidance of NUREG-0588 was not generically referenced or incorporated. Rather, the regulatory guide only references NUGEQ-0588 in discussions of (1) source terms; (2) upgrading on replacement; (3) 50.49(k) limitations; and (4) Value/Impact where the staff essentially states that 50.49 and Regulatory Guide 1.97 Rev. 1 effectively supersede CLI-80-21 and the guidance in the DOR Guidelines and NUREG-0588. Based on these considerations we believe reference to NUREG-0588 should be deleted in SRP 3.11 and Regulatory Guide 1.89 identified as the applicable staff guidance regarding compliance with 50.49.</p> <p>For future applicants if the staff believes that certain useful information and guidance is provided in NUREG-0588 and not in Regulatory Guide 1.89 Rev. 1 then it may be appropriate to suggest that the guidance in Category 1 of NUREG-0588 may be used if guidance is not provided in the regulatory guide.</p> <p>Finally, we note this SRP section discusses both NUREG-0588 Category 1 and Category 2. The Category 2 information was apparently retained (the 1996 draft deleted reference to Category 2) because existing plants use Category 2. We are somewhat concerned about this stated basis for retaining reference to Category 2. If the NRC staff wants to describe Category 2 then other environmental qualification related documents (e.g., DOR Guidelines, IEB 79-01B and</p>	<p>environment. However, certain NUREG-0588 Category 1 guidance may be used if relevant guidance is not provided in Regulatory Guide 1.89. NUREG-0588 includes two sets of qualification criteria, Category I and Category II. Category I refers to IEEE Std 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations." Category I applies to plants whose construction permit SERs were dated after July 1, 1974. Category II refers to IEEE Std 323-1971, and is not applicable to any future plants."</p> <p>2) Delete reference to NUREG-0588 in the discussion of several regulatory guides in the ACCEPTANCE CRITERIA section. Specifically delete the text ". . . and should be used in conjunction with NUREG-0588 and Regulatory Guide 1.89, as appropriate . . ." and replace with ". . . and should be used in conjunction with Regulatory Guide 1.89, as appropriate . . ." in the following items: #4 (RG 1.40), #5 (RG 1.63), #6 RG 1.73), #9 (RG 1.131), #11 (RG 1.156), #12 (RG 1.158), and #14 (RG 1.183).</p>	<p>2) Disagree</p> <p>The staff notes that this reference is still used by some operating reactors and, as suggested in comment 1 above, it could be used for certain relevant guidance. Therefore, the staff considers it an appropriate reference for SRP 3.11 and it will be retained.</p>	<p>Category 1 guidance may be used if relevant guidance is not provided in Regulatory Guide 1.89. NUREG0588 includes two sets of qualification criteria, Category I and Category II. Category I refers to IEEE Std 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations." Category I applies to plants whose construction permit SERs were dated after July 1, 1974. Category II refers to IEEE Std 323-1971, and is not applicable to any future plants.</p> <p>2) No changes made based on this comment.</p>

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	<p>supplements) applicable to existing plants but not future plants should be cited in this SRP section. If the staff determines that SRP 3.11 must reference the NUREG, then we would recommend limiting the discussion of Category 2 to a simple statement that Category 2 does not apply to future plants. If the staff chooses to retain further discussion of Category 2 applicability then the SRP should, at a minimum, also reference "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors" (DOR Guidelines) in that that guidance is also retained under Section 50.49(k) as potentially applicable to certain existing plants.</p>			
VII	<p>Confusing Reference and Applicability of IEEE Standards and Regulatory Guides</p> <p>SPR 3.11 ACCEPTANCE CRITERIA after listing applicable 10 CFR Sections identifies 22 items, the vast majority of which refer to specific regulatory guides or IEEE standards. Historically the NRC has been unable to issue/revise guides in a timely manner when IEEE standards are issued/revise. As a result virtually all the most recent and applicable IEEE standard versions do not have companion regulatory guides. In support of new reactor applications we anticipate that the NRC may give a higher priority to future regulatory guide revisions. The IEEE will continue to refine and revise its standards. As a result and given the current organization of the SRP 3.11 it will remain continually out of date.</p> <p>In order to resolve this problem with out-of-date regulatory guides and on-going IEEE standard revisions, the NUGEQ recommends the addition</p>	<p>1) In order to resolve this problem with out-of-date regulatory guides and on-going IEEE standard revisions, the NUGEQ recommends the addition of the following language in ACCEPTANCE CRITERIA on page 3.11-6 immediately preceding the 22 items. This language is based in part on language contained in a recently issued regulatory guide (RG 1.97 Rev. 4):</p> <p>"If the NRC staff has endorsed a referenced standard in a regulatory guide, that standard constitutes an acceptable method for use in meeting the related regulatory requirement as described in the regulatory guide. If a referenced standard has not</p>	<p>1) Agree</p>	<p>1) The following text added in Section II under SRP Acceptance Criteria as 2nd para, page 3.11-6 appropriately.</p> <p>"If the NRC staff has endorsed a referenced standard in a regulatory guide, that standard constitutes an acceptable method for use in meeting the related regulatory requirement as described in the regulatory guide. If a referenced standard has not been endorsed in a regulatory guide, licensees and applicants may consider and use the information in the referenced standard, if</p>

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	<p>of the following language in ACCEPTANCE CRITERIA on page 3.11-6 immediately preceding the 22 items. This language is based in part on language contained in a recently issued regulatory guide (RG 1.97 Rev. 4):</p> <p>“If the NRC staff has endorsed a referenced standard in a regulatory guide, that standard constitutes an acceptable method for use in meeting the related regulatory requirement as described in the regulatory guide. If a referenced standard has not been endorsed in a regulatory guide, licensees and applicants may consider and use the information in the referenced standard, if appropriately justified, consistent with current regulatory practice. When a regulatory guide references an older version of a standard, those portions of the newer version that are materially the same as the version cited in the regulatory guide or reflect NRC positions in the regulatory guide are appropriately justified by the regulatory guide.”</p> <p>If adopted this language obviates the need for item #15 on page 3.11-10. As discussed further below in examples 1 and 2 the IEEE standards cited in item #15 have either been withdrawn or focus on functional qualification of equipment in mild environments. The NUGEQ recommends that item #15 be deleted.</p> <p>The following are examples of other problems with the current referenced guides and standards.</p> <p>1. This proposed SRP 3.11 revision includes a new reference - Regulatory Guide 1.30, “Quality Assurance Requirements for the Installation,</p>	<p>been endorsed in a regulatory guide, licensees and applicants may consider and use the information in the referenced standard, if appropriately justified, consistent with current regulatory practice. When a regulatory guide references an older version of a standard, those portions of the newer version that are materially the same as the version cited in the regulatory guide or reflect NRC positions in the regulatory guide are appropriately justified by the regulatory guide.”</p> <p>2) If adopted this language obviates the need for item #15 on page 3.11-10. As discussed further below in examples 1 and 2 the IEEE standards cited in item #15 have either been withdrawn or focus on functional qualification of equipment in mild environments. The NUGEQ recommends that item #15 be deleted.</p>	<p>2) Agree</p>	<p>appropriately justified, consistent with current regulatory practice.”</p> <p>2) Item 15 under SRP Acceptance Criteria deleted.</p>

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	<p>Inspection, and Testing of Instrumentation and Electric Equipment,” August 1972. We question the addition of this 30+ year old guide as acceptance criteria for environmental qualification. While this guide focuses on installation and operational QA topics, the only 10 CFR Part 50, Appendix B criteria cited in SRP 3.11 are design control (III), test control (XI), and QA records (XVII). This guide, which is applicable to all safety-related instrument, control, and electrical equipment, is not even referenced by the most recent official versions of SRP 7 and SRP 8. The guide is also not referenced in Regulatory Guide 1.89 Rev. 1 or NUREG-0588. Since the guide is not cited in SRP 7 and SRP 8 or in other NRC environmental qualification guidance, why is being included in SRP 3.11? We recommend deleting this reference. If the staff retains this reference then it should also be incorporated more broadly in other SRP sections, including SRP 7 and 8.</p> <p>2. Several of the referenced IEEE standards and companion regulatory guides do not apply to equipment in harsh environments. These equipment qualification standards focus on functional qualification of electrical equipment and include some provisions for seismic qualification and possibly consideration of mild environment conditions. These documents include (1) Regulatory Guide 1.158, “Qualification of Safety-Related Lead Storage Batteries for Nuclear Power Plants” and IEEE 535, (2) IEEE Std 650, “IEEE Standard for Qualification of Class 1E Static Battery Chargers and Inverters for Nuclear Power Generating Stations,” and (3) IEEE Std 649, “IEEE Standard for Qualifying Class 1E Motor Control Centers for Nuclear</p>	<p>3) We recommend deleting this reference [Regulatory Guide 1.30, “Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment,” August 1972]. If the staff retains this reference then it should also be incorporated more broadly in other SRP sections, including SRP 7 and 8.</p> <p>4) We recommend that the SRP either delete reference to these functional qualification standards [RG 1.158, IEEE-535, IEEE-650, IEEE-649] or make clear that they typically apply to equipment in mild environments.</p> <p>5) We recommend that the SRP either delete reference to these standards [IEEE-381 and IEEE 627] or make clear which portions of these withdrawn standards are not contained in other guidance and are considered important enough to cite in this context.</p> <p>6) We recommend deleting reference to RG 1.131; reference to IEEE 383 should be retained.</p>	<p>3) Agree</p> <p>4) Agree</p> <p>RG 1.158 and IEEE-535 retained for guidance for qualification of batteries, if located in harsh (Radiation only) environment.</p> <p>5) Agree</p> <p>6) Disagree</p> <p>RG 1.131 draft retained for guidance purposes pending issuance of the Final version.</p>	<p>3) The reference RG 1.30 deleted from SRP 3.11, Revision 3.</p> <p>4) IEEE-649 AND 650 deleted.</p> <p>RG 1.158 and IEEE-535 retained for guidance for qualification of batteries, if located in harsh (Radiation only) environment.</p> <p>5) Reference to IEEE-381 and IEEE-627 standards deleted.</p> <p>6) No changes made based on this comment.</p>

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	<p>Power Generating Stations.” We note that other regulatory guides and IEEE standards applicable to functional qualification of electrical equipment are not identified here (e.g., RG 1.9, “Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants” and IEEE 387). We recommend that the SRP either delete reference to these functional qualification standards or make clear that they typically apply to equipment in mild environments.</p> <p>3. Two of the referenced IEEE standards have been withdrawn: IEEE 381, “IEEE Standard Criteria for Type Tests of Class 1E Modules Used in Nuclear Power Generating Stations” and IEEE 627, “IEEE Standard for Design Qualification of Safety Systems Equipment Used in Nuclear Power Generating Station”. We recommend that the SRP either delete reference to these standards or make clear which portions of these withdrawn standards are not contained in other guidance and are considered important enough to cite in this context.</p> <p>4. Regulatory Guide 1.131, “Qualification Tests of Electric Cables and Field Splices for Light-Water-Cooled Nuclear Power Plants,” was only issued in draft form (for comment in 1977 and proposed revision in 1979). The NRC never issued a final regulatory guide. The draft guide references IEEE 383-1974 which was reaffirmed in 1992. There was a significant revision to the IEEE standard in 2003. We recommend deleting reference to RG 1.131; reference to IEEE 383 should be retained.</p>	<p>7) Several regulatory guides cite versions of industry standards which have been revised several times since the cited versions.</p>	<p>7) Disagree</p> <p>The NRC staff has not endorsed all revisions to IEEE standards. The Regulatory Guides reference the version of the standard that is currently endorsed by the staff.</p> <p>If the NRC staff has endorsed a referenced standard in a regulatory guide, that standard constitutes an acceptable method for use in meeting the related regulatory requirement as described in the regulatory guide. If a referenced standard has not been endorsed in a regulatory guide, licensees and applicants may consider and use the information in the referenced standard, if appropriately justified, consistent with current regulatory practice.</p>	<p>7) No changes made based on this comment.</p>

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	<p>5. The only referenced regulatory guides which cite current IEEE standard versions are Regulatory Guide 1.63, "Electrical Penetration Assemblies in Containment Structures for Nuclear Power Plants (IEEE 317 1983 was reaffirmed in 2003) and Regulatory Guide 1.156, "Environmental Qualification of Connection Assemblies for Nuclear Power Plants," November 1987 (IEEE 572-1985 was reaffirmed in 2004). Several regulatory guides cite versions of industry standards which have been revised several times since the cited versions. Regulatory Guide 1.73, "Qualification Tests of Electric Valve Operators Installed Inside the Containment of Nuclear Power Plants" January, 1974 endorses IEEE 382-1972. The cited version was superseded by both 1985 and 1996 (reaffirmed in 2004) versions. Regulatory Guide 1.89 Rev. 1, "Environmental Qualification of Certain Electric Equipment Important to Safety in Nuclear Power Plants" endorses IEEE 323-1974. There have been two subsequent revisions, 1983 (reaffirmed in 1996) and 2003, to this critically important qualification standard. We anticipate that the NRC will issue a RG 1.89 revision in the near future. The above NUGEQ proposed language addresses this problem of reference to out of date versions of IEEE 323.</p>			
VIII	<p>New SRP 3.11 Positions Since 1996 Draft Version</p> <p>The following comments discuss four new technical positions in the proposed revision that do not appear in the 1996 draft, the 1981 version</p>	<p>1) Based on these considerations we recommend that this item [Section III Review Procedures – Item #4] be deleted. If deemed necessary, additional reviewer guidance regarding possible</p>	<p>1) Agree</p>	<p>1) The referenced item # 4 deleted and the text moved to the Review Interfaces subsection item 10.B from Review Procedure. Deleted reference ASME Std QME-1.</p>

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	<p>of SRP 3.11, or meet the NRC's own criteria regarding new SRP technical positions. A subsequent comment - SRP 3.11 Revision Control and Justification for Changes – discusses the staff's apparent failure to adhere to its procedure (LIC-200) for updating, reviewing, and issuing revised SRP sections.</p> <p>1. Section III Review Procedures – Item #4. Item #4 is unnecessary, confusing, redundant, and ambiguous regarding which NRC reviewers evaluate valve actuator functional performance and related temperature effects. We recommend that this item be deleted in its entirety. Item #4 states: "In addition to the evaluation of full environmental qualification, potential degradation of the operating performance of mechanical and electrical equipment under adverse environmental conditions needs to be addressed by the applicant and reviewed by the NRC staff." This item identifies an example (ambient temperature effects on motor torque), states that the industry has developed related but unidentified guidance regarding "degraded performance," identifies SRP3.9.6 as a source of guidance for pumps and valves, and observes that the NRC will be reviewing ASME standard QME- 1, "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants," for possible acceptance.</p> <p>This new Review Procedure guidance is confusing at best with much of the discussion unrelated to specific review procedures. What is "full environmental qualification" and why does it not consider "potential degradation of the operating performance of mechanical and electrical equipment under adverse</p>	<p>ambient temperature effects on actuated valves can be added to SRP 3.9.6 and should be the responsibility of that section's reviewers.</p> <p>2) Based on LIC-200 this [Section II Acceptance Criteria – Item #2 – flooding above the flood level. Item #4] should be identified as a new staff position or the text should be deleted. We recommend deleting this text and integrating this guidance into the planned revision to Regulatory Guide 1.89.</p>	<p>2) Disagree</p> <p>The information provided in this paragraph related to flooding above the flood level is based on past operating experience. It is provided as clarification and guidance in meeting the requirements of IEEE Std.-323. For example, components inside electrical enclosures</p>	<p>The text was revised as follows:</p> <p>SRP 3.9.6 includes functional design and qualification of pumps, valves, and dynamic restraints at a nuclear power plant. The review includes the potential impact of adverse environmental conditions on active mechanical and electrical equipment. For example, electric motors might produce less torque under high temperature conditions than under ambient conditions, which could impact their capability to operate their individual pumps or valves.</p> <p>2) This item is retained and refer to item 3) below for clarification.</p>

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	<p>environmental conditions?” What is the specific industry guidance that is being identified?5 Why isn't the guidance in SRP3.9.6, and associated staff review, sufficient to address Item #4 concerns regarding environmental effects on functional performance of pumps, valves, and snubbers? Shouldn't the concerns and associated guidance expressed in this item be the responsibility of the SRP3.9.6 reviewers using information from SRP 3.11 regarding the applicable environmental conditions? Why is the staff identifying its future consideration of ASME QME-1 in a Review Procedures section? We note that although several versions of ASME QME-1 have existed for some time, the NRC has not previously used or formally reviewed the guidance of this standard for use on any existing or proposed plants.</p> <p>Although this item should be deleted, we interpret the possible intended meaning of the item (based on other SRP 3.11 guidance) to be that “full environmental qualification” for mechanical equipment is generally limited to determining the suitability of materials, parts, and equipment, with emphasis on “soft parts” (i.e., gaskets, seals, lubricants, diaphragms). This perspective is adequately addressed in item #18 – page 3.11-11. Further, we interpret the item to mean that other activities necessary to support the functional capability of such equipment under design basis conditions are described and evaluated under other SRP 3 subsections, particularly 3.9.6. This perspective is adequately addressed in item #12 – page 3.11-5. Regarding ambient temperature effects on MOV electric motors, this is addressed during design, environmental qualification of electric actuators,</p>	<p>3) On a technical level this item also inappropriately requires enclosure drain holes to drain “any accumulated water” for all enclosures where water accumulation is possible. It would be more appropriate to revise the last sentence in the operative paragraph to read: “Equipment in such locations, whose design is such that water accumulation is possible, should have measures to preclude such accumulation (e.g., enclosure drain holes) or the affected equipment should be qualified for the anticipated submergence.”</p> <p>4) Given these considerations IN 98-21 and referenced documents</p>	<p>subjected to submergence due water and moisture intrusion. This standard does not represent a new qualification requirement, and the staff does not consider this information to be a change in the qualification requirements. Refer to 10 CFR 50.49 (e)(6) and RG 1.89 position C.3.a. Consequently, this does not represent a new staff position.</p> <p>3) Agree</p> <p>4) Agree</p>	<p>3) The last sentence of Item 2 on page 3.11-7 revised as follows:</p> <p>The reviewer should confirm that equipment in such locations, whose design is such that water accumulation is possible, should have measures to preclude such accumulation (e.g., enclosure drain holes) or the affected equipment should be qualified for the anticipated submergence.</p> <p>4) The 3rd paragraph of Item 2 on page 3.11-7 related to</p>

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	<p>and functional qualification of actuator/valve assemblies (see SRP 3.9.6 provisions regarding “ambient temperature”). Further, this guidance, regarding possible torque effects of ambient temperature, applies to reviews conducted under SRP 3.9.6 and not SRP 3.11. We agree that the environmental qualification of electrical equipment, such as motors, and the application of that information to plant equipment, such as actuated valves, must consider possible environmental degradation of the equipment’s performance characteristics (e.g., motor torque and cable resistance). However, such guidance already exists in the SRP and referenced documents and item #4 only adds confusion.</p> <p>Based on these considerations we recommend that this item be deleted. If deemed necessary, additional reviewer guidance regarding possible ambient temperature effects on actuated valves can be added to SRP 3.9.6 and should be the responsibility of that section’s reviewers.</p> <p>2. Section II Acceptance Criteria – Item #2 – flooding above the flood level. Item #4 (page 3.11-7) includes new SRP guidance regarding flooding above the flood level based on operating experience in Information Notice 89-63. On a procedural level and according to LIC-2006, new staff guidance based on operating experience (including experience based on NRC generic letters and bulletins) should be classified as a new staff position with associated ACRS and CRGR reviews. However, the SRP 3.11 transmitting memorandum states that SRP 3.11 contains no new guidance.⁷ Based on LIC-200 this should be identified as a new staff position or the text should be deleted. We recommend</p>	<p>do not call into question “overly accelerated aging” and this SRP 3.11 paragraph [Section II Acceptance Criteria – Item #2 – overly accelerated aging. Item #4] should be deleted or some other supportable basis documents cited to support this concern (overly accelerated aging). Finally and as a practical matter, we note that the only NRC reviewer guidance provided here regarding overly accelerated aging is to evaluate qualification test results “while considering the specific application and set of environmental conditions under which the equipment must operate.” This is a meaningless generic platitude with no relevant guidance regarding overly accelerated aging. The NUGEQ disagrees with this guidance.</p> <p>5) The NUGEQ recommends deleting this paragraph [Section II Acceptance Criteria – Item #2 – integrated HRRM system testing. Item #4] or revising it to accurately reflect the referenced documents and subsequent evaluations.</p>	<p>5) Agree</p>	<p>IN 98-21 deleted.</p> <p>5) The 4th paragraph of Item 2 on page 3.11-7 related IN 97-45 for HRRMs deleted.</p>

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	<p>deleting this text and integrating this guidance into the planned revision to Regulatory Guide 1.89.</p> <p>On a technical level this item also inappropriately requires enclosure drain holes to drain “any accumulated water” for all enclosures where water accumulation is possible. It would be more appropriate to revise the last sentence in the operative paragraph to read: “Equipment in such locations, whose design is such that water accumulation is possible, should have measures to preclude such accumulation (e.g., enclosure drain holes) or the affected equipment should be qualified for the anticipated submergence.”</p> <p>3. Section II Acceptance Criteria – Item #2 – overly accelerated aging. Item #4 (page 3.11-7) includes new SRP guidance regarding “overly accelerated aging” based on operating experience in Information Notice 98-21.</p> <p>On a procedural level and according to LIC-200, new staff guidance based on operating experience (including experience based on NRC generic letters and bulletins) should be classified as a new staff position with associated ACRS and CRGR reviews. However, the SRP 3.11 transmitting memorandum states that SRP 3.11 contains no new guidance. Based on LIC-200 this should be identified as a new staff position or the text should be deleted. We recommend deleting this text and integrating this guidance into the planned revision to Regulatory Guide 1.89. On a technical level this item incorrectly concludes that the performance problems cited IN 98-21 were due to overly accelerated aging of the test specimens during the original</p>			

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	<p>qualification. IN 98-21 does state that the test specimens were “aged more slowly” in the NRC-sponsored research but never concludes that this aging methodology was responsible for the reported performance problems. The IN does indicate the Sandia testing raises potential issues for connectors that exhibit low/marginal insulation resistance values or were not subjected to dielectric withstand tests. A detailed 1998 NUGEQ review of the Sandia testing referenced in the IN indicated that many performance problems may have been caused by test anomalies, including possible unplanned submergence of the test specimens, and differences between the test sequence/configuration used by Sandia and those used during the vendor qualification tests. In addition, for several specimens the Sandia aging conditions, based on an Arrhenius analysis, exceeded those in the vendor qualification tests. Given these considerations IN 98-21 and referenced documents do not call into question “overly accelerated aging” and this SRP 3.11 paragraph should be deleted or some other supportable basis documents cited to support this concern (overly accelerated aging). Finally and as a practical matter, we note that the only NRC reviewer guidance provided here regarding overly accelerated aging is to evaluate qualification test results “while considering the specific application and set of environmental conditions under which the equipment must operate.” This is a meaningless generic platitude with no relevant guidance regarding overly accelerated aging. The NUGEQ disagrees with this guidance.</p> <p>4. Section II Acceptance Criteria – Item #2 – integrated HRRM system testing. Item #4 (page</p>			

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	<p>3.11-7) includes new SRP guidance regarding the need for integrated qualification testing of high-range radiation monitors (HRRM) together with the cables and containment penetration pigtails based on operating experience in Information Notice 97-45 and its supplement. Again, on a procedural level and according to LIC- 200, new staff guidance based on operating experience (including experience based on NRC generic letters and bulletins) should be classified as a new staff position with associated ACRS and CRGR reviews. However, the SRP 3.11 transmitting memorandum states that SRP 3.11 contains no new guidance. Based on LIC-200 this should be identified as a new staff position or the text should be deleted. We recommend deleting this text and integrated this guidance into the planned revision to Regulatory Guide 1.89.</p> <p>On a technical level this guidance incorrectly concludes that a lack of integrated testing resulted in spurious changes in HRRM output during environmental transients. IN 97- 45 Supplement 1 reports on the transient thermal effects to HRRM output that are due to inherent characteristics of certain coaxial cable styles. This phenomenon, based on the IN and subsequent EPRI research, is affected by cable length and the rate of ambient temperature change. The phenomenon is NOT related to an absence of integrated qualification testing. Further, IN 97-45 describes a second issue - HRRM cable moisture intrusion during a LOCA simulation that migrated to the cable connector and caused partial shorting – that is not discussed in SRP 3.11. The IN suggests that the absence of integrated testing of the cable/connector or adequate consideration of the</p>			

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	<p>plant cable/connector physical layout may have contributed to this moisture migration problem. Regarding this second phenomena cable styles which preclude significant intrusion/migration or cable/connector designs which prevent moisture migration into the connector are methods of addressing this potential deficiency. The NUGEQ recommends deleting this paragraph or revising it to accurately reflect the referenced documents and subsequent evaluations.</p>			
IX	<p>50.49 Exemption for Reg. Guide 1.97 and Other References to Reg. Guide 1.97</p> <p>Both draft 1996 and draft 2007 SRP 3.11 contain erroneous guidance regarding the need for an exemption from 10 CFR 50.49(b)(3) for plants that use RG1.97 Rev.3 or Rev.4. The perpetuation of this erroneous guidance is an example of the problem with the NRC concluding, absent detailed public review, that the 1996 draft represents current accepted staff practice.</p> <p>The proposed SRP 3.11 states:</p> <p>“For new applications, the staff may accept an exemption from the requirement of 10 CFR 50.49(b)(3) to qualify certain types of post-accident monitoring equipment in accordance with Revision 2 to Regulatory Guide 1.97, if the applicant commits to conformance with the latest revision of Regulatory Guide 1.97, which meets the underlying purpose of the 10 CFR 50.49 rule.” (pg 3.11-17)</p> <p>This statement is incorrect. A licensee may take exception to the Regulatory Guide, but the Guide is not a requirement for which an exemption</p>	<p>1) The NUGEQ recommends deleting REVIEW PROCEDURES item #3 on page 3.11-17. If the NRC concludes that additional guidance is warranted then we suggest the following in lieu of item #3:</p> <p>“For new applications, the 10 CFR 50.49(b)(3) requirement to qualify certain types of post-accident monitoring (PAM) equipment located in a harsh environment applies to those instruments identified as requiring such qualification based on the applicant’s submittal and the NRC review thereof, including the review conducted under SRP Chapter 7. The regulatory requirements in 10 CFR 50.49(b)(3) do not dictate compliance with the guidance in Revision 2 to Regulatory Guide 1.97, and applicants and licensees may justify exceptions to the provisions of that guide.”</p>	1) Agree	<p>1) Section III REVIEW PROCEDURES, Item 3 revised to read as follows:</p> <p>“For new applications, the 10 CFR 50.49(b)(3) requirement to qualify certain types of post-accident monitoring (PAM) equipment located in a harsh environment applies to those instruments identified as requiring such qualification based on the applicant’s submittal and the NRC review thereof, including the review conducted under SRP Chapter 7. The regulatory requirements in 10 CFR 50.49(b)(3) reference the guidance in Revision 2 to Regulatory Guide 1.97.”</p> <p>Applicants and licensees may use the later revisions of Regulatory Guide 1.97 , when appropriate.</p>

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	<p>would be required.</p> <p>As a matter of law reference to a separate document, standard, or other information in a regulation does not, by itself, codify or incorporate the reference as a legal requirement. Such information is only incorporated by reference if the Director of the Federal Register has approved the incorporation in accordance with 5 U.S.C. 552(a) and 1 C.F.R. Part 51. This was not done in this instance and Regulatory Guide 1.97 is not included in the NRC's Material Approved for Incorporation by Reference (see 10 C.F.R. "Material Approved for Incorporation by Reference").⁸ In fact, the NRC previously recognized the status of Regulatory Guide 1.97 as guidance, even though identified in a footnote in 10 C.F.R. §50.49. Specifically, in 1984 as a result of discussions between the NUGEQ and the NRC legal and technical staff, the NRC clarified its interpretation of the legal significance of footnote 4 to 50.49(b)(3). In a subsequently issued EQ SER9 the NRC recognized that a licensee can provide justification for not including within the scope of 10 CFR 50.49(b) Regulatory Guide 1.97, Rev. 2, Category 1 and 2 variables located in a harsh environment. Further, the acceptability of these justifications would be determined by the staff as part of its review for conformance with Regulatory Guide 1.97. That EQ SER concludes that such an approach for identifying equipment within the scope of 10 CFR 50.49(b)(3) is in accordance with the requirements of that paragraph.</p> <p>The NUGEQ recommends deleting REVIEW PROCEDURES item #3 on page 3.11-17. If the NRC concludes that additional guidance is</p>	<p>2) Incorporate specific reference to post-accident monitoring (PAM) in Review Interfaces item #5 page 3.11-4. For example, the first sentence would be revised to read: "The adequacy of the design, installation, inspection, and testing of instrumentation and controls, including the post-accident monitoring (PAM) equipment identified in 50.49(b)(3), is reviewed as part of the licensing review under SRP Chapter 7." (emphasis added)</p> <p>3) Delete reference to Regulatory Guide 1.97 on page 3.11-2 item 1.F. The revised text reads: "Certain post-accident monitoring equipment, as described in 10 CFR 50.49(b)(3)."</p>	<p>2) Agree</p> <p>3) Disagree</p> <p>The regulatory requirements in 10 CFR 50.49(b)(3) reference the guidance in Revision 2 to Regulatory Guide 1.97. Therefore, RG 1.97 is an appropriate reference for post-accident monitoring equipment in SRP 3.11. (For operating plants) See Item 3 under Review</p>	<p>2) Review Interface Item 3 revised to read as follows:</p> <p>"Review of the adequacy of the design, installation, inspection, and testing of instrumentation and controls, including the functional design and qualification of digital instrumentation and control equipment located in a mild environment and the post-accident monitoring (PAM) equipment identified in 10 CFR 50.49 (b) (3), is performed under SRP Chapter 7. Qualification guidance of digital I&C equipment located in a mild environment is also addressed in Regulatory Guide 1.209.</p> <p>3) No changes made as a result of this comment.</p>

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	<p>warranted then we suggest the following in lieu of item #3:</p> <p>“For new applications, the 10 CFR 50.49(b)(3) requirement to qualify certain types of post-accident monitoring (PAM) equipment located in a harsh environment applies to those instruments identified as requiring such qualification based on the applicant’s submittal and the NRC review thereof, including the review conducted under SRP Chapter 7. The regulatory requirements in 10 CFR 50.49(b)(3) do not dictate compliance with the guidance in Revision 2 to Regulatory Guide 1.97, and applicants and licensees may justify exceptions to the provisions of that guide.”</p> <p>In any event, the NUGEQ understands that this question was raised in a meeting with AREVA held on November 29, 2006, and, as reflected in the NRC Staff’s summary of that meeting, dated January 28, 2007, the NRC acknowledged that an exemption would not be required. Rather, the licensee may take exceptions to the Regulatory Guide which will be reviewed by the NRC on a case-by-case basis.</p> <p>The NUGEQ further notes that the applicant’s post-accident monitoring (PAM) program, as accepted by the NRC, including review applying SRP Chapter 7, and not Regulatory Guide 1.97 (directly), defines which PAM devices should be qualified to 50.49(b)(3). This is particularly true for Regulatory Guide 1.97 Rev. 4 which does not define specific instruments in PAM categories. In this regard the NUGEQ recommends the following:</p>	<p>4) Delete ACCEPTANCE CRITERIA item #8 on page 3.11-8 which describes Regulatory Guide 1.97 as part of the SRP 3.11 acceptance criteria for PAM instruments.</p> <p>5) Delete REVIEW PROCEDURES item #3 on page 3.11-17 (see discussion above regarding 50.49 footnote).</p> <p>6) Delete REFERENCE Item #35 which references Regulatory Guide 1.97.</p>	<p>Procedures</p> <p>4) Disagree</p> <p>The regulatory requirements in 10 CFR 50.49(b)(3) reference the guidance in Revision 2 to Regulatory Guide 1.97. RG 1.97 provides guidance on I&C equipment that needs to be qualified for harsh environment as required by 10 CFR 50.49(b)(3).</p> <p>New applicants may use the later revisions of the RG when appropriate. See response to item 1 above and 2nd para under SRP Acceptance Criteria.</p> <p>5) Agree</p> <p>6) Disagree</p> <p>The regulatory requirements in 10 CFR 50.49(b)(3) reference the guidance in Revision 2 to Regulatory Guide 1.97.</p>	<p>4) No changes made based on this comment. This is item 7 in Acceptance Criteria section.</p> <p>5) Section III REVIEW PROCEDURES, Item 3 will be replaced as discussed in comment 1 above.</p> <p>6) No changes made based on this comment.</p>

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	<p>Incorporate specific reference to post-accident monitoring (PAM) in Review Interfaces item #5 page 3.11-4. For example, the first sentence would be revised to read: "The adequacy of the design, installation, inspection, and testing of instrumentation and controls, including the post-accident monitoring (PAM) equipment identified in 50.49(b)(3), is reviewed as part of the licensing review under SRP Chapter 7." (emphasis added)</p> <p>Delete reference to Regulatory Guide 1.97 on page 3.11-2 item 1.F. The revised text reads: "Certain post-accident monitoring equipment, as described in 10 CFR 50.49(b)(3)."</p> <p>Delete ACCEPTANCE CRITERIA item #8 on page 3.11-8 which describes Regulatory Guide 1.97 as part of the SRP 3.11 acceptance criteria for PAM instruments.</p> <p>Delete REVIEW PROCEDURES item #3 on page 3.11-17 (see discussion above regarding 50.49 footnote).</p> <p>Delete REFERENCE Item #35 which references Regulatory Guide 1.97.</p>		<p>RG 1.97 is an appropriate reference for SRP 3.11 for qualification of post-accident monitoring equipment. RG 1.97 is used in other SRP sections.</p>	
X.	<p>Digital Instrument and Control Equipment</p> <p>1. The proposed SRP 3.11 revision has added the word "digital" before virtually all text occurrences of "instrumentation and control". Although there will be a significant amount of digital I&C devices and systems in future reactors, this change incorrectly limits the SRP 3.11 guidance to only digital instrumentation and control. It</p>	<p>1) Page 1 AREAS OF REVIEW – paragraph 1: Replace "digital instrumentation and control" with "instrumentation and control" and footnote as follows: "the use of the term instrumentation and control in this section unless otherwise stated has applicability to all types of instrumentation and control"</p>	<p>1) Agree</p>	<p>1) The first sentence of Section I AREAS OF REVIEW revised to read as follows:</p> <p>"...(mechanical, electrical, and instrumentation and control (I&C), including digital I&C)..."</p>

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	<p>would be more appropriate to establish early in the text that use of the term “instrumentation and control” unless otherwise clarified has applicability to all types of instrumentation and control equipment, including digital and analog devices. Subsequent use of digital and analog would then imply that the applicable guidance is limited to that specific type of device.</p> <p>Page 1 AREAS OF REVIEW – paragraph 1: Replace “digital instrumentation and control” with “instrumentation and control” and footnote as follows: “the use of the term instrumentation and control in this section unless otherwise stated has applicability to all types of instrumentation and control equipment, including digital and analog devices.”</p> <p>Page 2 – delete both occurrences of “digital”.</p> <p>Page 4 – delete 2 occurrences of “digital” and retain the one “digital” reference in the sentence “Guidance for the qualification of digital instrumentation and control equipment located in both mild and harsh environment is also provided in SRP Chapter 7.”</p> <p>Page 9 – retain the one “digital” reference in the sentence “Guidance for the qualification of digital instrumentation and control equipment located in both mild and harsh environment is also provided in SRP Chapter 7.”</p> <p>2. In the Page 4 and 9 sentences cited above - “Guidance for the qualification of digital instrumentation and control equipment located in both mild and harsh environment is also provided in SRP Chapter 7.” It is important to recognize</p>	<p>equipment, including digital and analog devices.”</p> <p>2) Page 2 – delete both occurrences of “digital”.</p> <p>3) Page 4 – delete 2 occurrences of “digital” and retain the one “digital” reference in the sentence “Guidance for the qualification of digital instrumentation and control equipment located in both mild and harsh environment is also provided in SRP Chapter 7.”</p> <p>4) Add the following to Review Interfaces:</p> <p>“13. The functional design and qualification of digital instrumentation and control equipment is addressed in SRP Chapter 7.”</p> <p>5) If the title and scope of the regulatory guide [DG-1142, Guidelines for Environmental Qualification of Safety Related Computer-Based Instrumentation and Control Systems in Nuclear Power Plants] focus on environmental qualification rather than functional qualification of digital systems, then the anticipated regulatory guide should be referenced in SRP 3.11.</p>	<p>2) Agree</p> <p>3) Agree</p> <p>4) Agree</p> <p>5) Agree</p>	<p>2) The requested deletion made.</p> <p>3) The requested changes made.</p> <p>4) The Review Interface item 3 revised as discussed in response to comment IX-2.</p> <p>5) Reference to RG 1.209, which is the Regulatory Guide corresponding to DG-1142 added.</p>

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	<p>that the term qualification has a broader meaning (i.e., functional qualification) than environmental qualification. This distinction may be lost absent some clarifying language. It also appears appropriate to identify "qualification of digital instrumentation and control equipment" as an additional item in the SRP section on Review Interfaces. The NUGEQ recommends adding the following to Review Interfaces:</p> <p>"13. The functional design and qualification of digital instrumentation and control equipment is addressed in SRP Chapter 7."</p> <p>3. The NRC has published and received comments, including those provided by the NUGEQ, on DG-1142, Guidelines for Environmental Qualification of Safety Related Computer-Based Instrumentation and Control Systems in Nuclear Power Plants. However, there is no reference to this anticipated regulatory guide in SRP 3.11. If the title and scope of the regulatory guide focus on environmental qualification rather than functional qualification of digital systems, then the anticipated regulatory guide should be referenced in SRP 3.11.</p>			
XI.	<p>Maintenance Rule and Acceptance Criteria for Mild Environment Equipment</p> <p>In ACCEPTANCE CRITERIA page 3.11-11, item #19 presents guidance on environmental qualification of electrical and mechanical equipment located in mild environments. The guidance in the second paragraph includes the discussion of a "well-supported maintenance/surveillance program," a "preventive</p>	<p>1) Delete the language in the second paragraph [ACCEPTANCE CRITERIA page 3.11-11, item #19] and replace with the following:</p> <p>"Compliance with 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," and associated guidance in Regulatory</p>	1) Agree	<p>1) The 2nd paragraph of Item 15, in Section II ACCEPTANCE CRITERIA modified to read as follows:</p> <p>"A well-supported maintenance/surveillance program, in conjunction with a good preventive maintenance program, is</p>

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	<p>maintenance program” and periodic reviews of maintenance records. The language in this paragraph originally appeared in the 1981 revision of SRP 3.11 before promulgation of 10 CFR 50.65, “Requirements for monitoring the effectiveness of maintenance at nuclear powerplants,” and associated industry and NRC guidance (e.g., Regulatory Guide 1.160 and NUMARC 93-01). The maintenance rule effectively encompasses this SRP 3.11 guidance, including considerations associated with periodic maintenance, monitoring, and periodic evaluations. Consequently, the guidance provided in SRP 3.11 is redundant, outdated, and potentially at odds with 50.65 (e.g., the SRP 3.11 guidance specifies a periodic review at least every 18 months while 50.65 specifies at least every 24 months).</p> <p>We recommended that the language in this second paragraph be deleted and replaced with the following:</p> <p>“Compliance with 10 CFR 50.65, “Requirements for monitoring the effectiveness of maintenance at nuclear power plants,” and associated guidance in Regulatory Guide 1.160 are sufficient to provide reasonable assurance that environmental considerations established during design are maintained on a continuing basis during operation.”</p> <p>It may also be appropriate to identify 10 CFR 50.65 and Regulatory Guide 1.160 in the ACCEPTANCE CRITERIA and REFERENCES sections.</p>	<p>Guide 1.160 are sufficient to provide reasonable assurance that environmental considerations established during design are maintained on a continuing basis during operation.”</p> <p>2) Identify 10 CFR 50.65 and Regulatory Guide 1.160 in the ACCEPTANCE CRITERIA and</p>	<p>2) Agree</p>	<p>sufficient to ensure that equipment that meets the design/purchase specifications is qualified for the designed life. Compliance with 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," and associated guidance in Regulatory Guide 1.160 are sufficient to provide reasonable assurance that environmental considerations established during design are reviewed every refueling outage and maintained on a continuing basis to ensure that the qualified design life has not been reduced by thermal, radiation, and/or cyclic degradation resulting from unanticipated operational occurrences or service conditions. Modification to the replacement program and/or replacement of equipment should be based on the review of maintenance/surveillance data.”</p> <p>2) The requested references added. 10 CFR 50.65 as reference 7 and RG 1.160 as</p>

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		REFERENCES sections.		reference 30.
XII	<p>Out of Date References</p> <p>SRP 3.11 Section VI REFERENCES identifies a number of retired or out-of-date standards. This creates confusion regarding which standards and versions should be used by licensees. NUGEQ comment - Confusing Reference and Applicability of IEEE Standards and Regulatory Guides – contains recommendations intended to limit confusion regarding applicable IEEE standards.</p> <p>The NUGEQ has annotated the following SRP 3.11 references with [bracketed bold text] to clarify the revision status of these standards. The NRC should consider similar information in the SRP.</p> <p>9. IEEE Std 317-1983 (reaffirmed 1992), “IEEE Standard for Electric Penetration Assemblies in Containment Structures for Nuclear Power Generation Stations,” Institute of Electrical and Electronics Engineers (endorsed by Regulatory Guide 1.63). [reaffirmed in 2003]</p> <p>10. IEEE Std 323-1974, “IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations,” Institute of Electrical and Electronics Engineers (endorsed by Regulatory Guide 1.89 and NUREG-0588). [revised in 1983 and 2003]</p> <p>11. IEEE Std 334-1971, “IEEE Trial-Use Guide for Type Tests of Continuous-Duty Class 1</p>	<p>1) The NUGEQ has annotated the following SRP 3.11 references with [bracketed bold text] to clarify the revision status of these standards. The NRC should consider similar information in the SRP.</p>	<p>1) Disagree</p> <p>NRC policy is to perform a detailed staff review of industry standards before endorsing those standards as an acceptable method of meeting regulations. While NRC is aware that various standards have been revised, the latest revisions are not always endorsed by the staff for various reasons, including unacceptable content. However, in certain instances, standards that have not been endorsed by the staff may contain useful information and may be used as reference documents. The references cited are for standards that have been endorsed, and are acceptable to the staff to meet the requirements for which they were intended, or for standards that may be useful as reference documents. Therefore, referencing a version of a</p>	<p>1) No changes made based on this comment.</p>

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	<p>Motors Installed Inside the Containment of Nuclear Power Generating Stations,” Institute of Electrical and Electronics Engineers (endorsed by Regulatory Guide 1.40). [revised in 1974, reaffirmed in 1980, revised in 1994]</p> <p>12. IEEE Std 381-1977 (reaffirmed 1984), “IEEE Standard Criteria for Type Tests of Class 1E Modules Used in Nuclear Power Generating Stations,” Institute of Electrical and Electronics Engineers. [withdrawn in 1994]</p> <p>13. IEEE Std 382-1972, “IEEE Trial-Use Guide for Type Test of Class 1 Electric Valve Operators for Nuclear Power Generating Stations,” Institute of Electrical and Electronics Engineers. (as endorsed by Regulatory Guide 1.73.) [revised in 1985 and 1996 and reaffirmed in 2004]</p> <p>14. IEEE Std 383-2003, “IEEE Standard for Type Test of Class 1E Electric Cables and Field Splices for Nuclear Power Generating Stations,” Institute of Electrical and Electronics Engineers (endorsed by Regulatory Guide 1.131). [reaffirmed in 1992 and revised in 2003]</p> <p>15. IEEE Std 535-1986, “IEEE Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Stations,” Institute of Electrical and Electronics Engineers. [reaffirmed in 1994 and revised in 2006]</p> <p>16. IEEE Std 572-1985, “IEEE Standard for Qualification of Class 1E Connection Assemblies for Nuclear Power Generating Stations,” Institute of Electrical and Electronics Engineers (endorsed by Regulatory Guide 1.156). [reaffirmed in 1992 and 2004]</p>	<p>2) The NUGEQ recommends deleting this reference to Regulatory Guide 1.131, “Qualification Tests of Electric Cables, Field Splices, and Connections for Light-Water-Cooled Nuclear Power Plants”</p> <p>3) SRP 3.11 Section VI REFERENCES for a number of regulatory guides identifies the endorsed version of the applicable IEEE standard, such as “(this guide endorses IEEE Std 382-1972)”. It may be more appropriate to delete this information since subsequent regulatory guide revisions are likely to endorse more recent versions, thus rendering the SRP 3.11 information obsolete. If the endorsed version text was deleted then the reference would not be obsolete when the regulatory guides are revised.</p>	<p>standard that has been superceded by a revision does not necessarily constitute an out of date reference. Instead, it represents the latest version of the standard that has been endorsed by the staff.</p> <p>2) Disagree</p> <p>RG 1.131 draft retained for guidance purposes pending issuance of the Final version.</p> <p>3) Disagree</p> <p>(See response to comment 1 above.)</p>	<p>2) No changes made based on this comment.</p> <p>3) No changes made based on this comment.</p>

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	<p>17. IEEE Std 627-1980 (reaffirmed 1991), "IEEE Standard for Design Qualification of Safety Systems Equipment Used in Nuclear Power Generating Station," Institute of Electrical and Electronics Engineers. [withdrawn]</p> <p>18. IEEE Std 649-1980, "IEEE Standard for Qualifying Class 1E Motor Control Centers for Nuclear Power Generating Stations," Institute of Electrical and Electronics Engineers. [revised in 1991, reaffirmed in 1999 and 2004, and revised in 2006]</p> <p>19. IEEE Std 650-1979, "IEEE Standard for Qualification of Class 1E Static Battery Chargers and Inverters for Nuclear Power Generating Stations," Institute of Electrical and Electronics Engineers. [revised in 1990 and 2006]</p> <p>SRP 3.11 Section VI REFERENCES identifies Regulatory Guide 1.131, "Qualification Tests of Electric Cables, Field Splices, and Connections for Light-Water-Cooled Nuclear Power Plants" and indicates that this guide endorses IEEE 383-2003. To our knowledge the NRC has never formally issued RG 1.131. According to the NRC website the For Comment version was published August 1977 and Proposed Revision 1, was published August 1979 (which is being referenced by the SRP). No similarly named draft guide was identified on the website. Based on this information the NUGEQ concludes that none of the available draft versions could have endorsed IEEE 383- 2003 which was published 20+ years after these draft versions. The NUGEQ recommends deleting this reference.</p> <p>SRP 3.11 Section VI REFERENCES for a</p>			

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	<p>number of regulatory guides identifies the endorsed version of the applicable IEEE standard, such as “(this guide endorses IEEE Std 382-1972)”. It may be more appropriate to delete this information since subsequent regulatory guide revisions are likely to endorse more recent versions, thus rendering the SRP 3.11 information obsolete. If the endorsed version text was deleted then the reference would not be obsolete when the regulatory guides are revised.</p>			
XIII	<p>Environmental Qualification for Radiation Harsh Conditions</p> <p>It is currently a common and accepted practice to qualify in accordance with 10 CFR 50.49 certain electrical equipment in ‘Radiation Only’ harsh conditions using analysis of radiation test information (i.e., partial test data) combined with appropriate consideration of margin and aging effects for nonmetallic components/materials. This methodology meets 10 CFR 50.49(f)(4) and is similar to the material evaluations conducted for mechanical equipment in harsh environments (see Item # 18 on page 3.11-11). The staff recognized and accepted this practice as consistent with its position in cases where sufficient documentation is available to preclude the need for a type test.¹⁰</p> <p>The NUGEQ recommends the addition of the following new paragraph on page 3.11-10 to Item #14.</p> <p>“Environmental qualification for electrical equipment located in a ‘Radiation- Harsh’ environment (i.e., locations where radiation is the only harsh environmental condition) can be</p>	<p>1) Add the following new paragraph on page 3.11-10 to Item #14.</p> <p>“Environmental qualification for electrical equipment located in a ‘Radiation- Harsh’ environment (i.e., locations where radiation is the only harsh environmental condition) can be accomplished in accordance with 10 CFR 50.49(f)(4) using analysis combined with radiation test information (i.e., partial test data) and appropriate consideration of margin and aging effects for nonmetallic components/materials when sufficient documentation is available to preclude the need for a type test.</p>	<p>1) Agree</p> <p>This is now item # 12.</p>	<p>1) The following new paragraph added to Section II ACCEPTANCE CRITERIA, Item #12.</p> <p>“Environmental qualification for electrical equipment located in a ‘Radiation harsh’ environment (i.e., locations where radiation is the only harsh environmental condition) can be accomplished in accordance with 10 CFR 50.49(f)(4) using analysis of test data (from identical materials) combined with radiation test information (i.e., partial test data), and appropriate consideration of margin and aging effects for nonmetallic components/materials when sufficient documentation is available to preclude the need for a type test.”</p>

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	<p>accomplished in accordance with 10 CFR 50.49(f)(4) using analysis combined with radiation test information (i.e., partial test data) and appropriate consideration of margin and aging effects for nonmetallic components/materials when sufficient documentation is available to preclude the need for a type test.</p>			
XIV	<p>Environmental Qualification as an Operational Program</p> <p>Item #20 on page 3.11-11, Item #11 on page 3.11-15, and Item #6 on page 3.11-17 discuss COL operational programs and required milestones. The NUGEQ has not evaluated the specific criteria used to determine if environmental qualification is considered an operational program. However, SECY-05-0197 Attachment 1 lists operational programs identified by NEI. The attachment indicates that NEI identified "Equipment Qualification" as such a program with the applicable regulation as 50.49. NEI has incorrectly named this program as "equipment" qualification; 50.49 and related guidance are for "environmental" qualification of certain electrical equipment located in a harsh environment. Importantly, SECY-05-0197 makes clear that the "operational" environmental qualification program is limited to 10 CFR 50.49.</p> <p>NEI and the SECY recognize that the applicable regulation for this operational program is 50.49. There are no other operational programs identified in the SECY for seismic qualification, equipment qualification, mechanical equipment qualification, or for environmental qualification of equipment (electrical or mechanical) in mild</p>	<p>1) Item #20 revised to read:</p> <p>"For COL applicants, in addition to the meeting the acceptance criteria for the program elements described above, acceptable implementation milestones must be identified for operational programs. An acceptable implementation milestone for the 10 CFR 50.49 environmental qualification program for certain electrical equipment located in a harsh environment is to have all qualification requirements met prior to the loading of fuel.</p> <p>2) Item #11 – last sentence revised to read:</p> <p>"The 10 CFR 50.49 environmental qualification program for certain</p>	<p>1) Agree</p> <p>This is item # 16.</p> <p>2) Agree</p> <p>This is item # 10.</p>	<p>1) Item 16, on page 3.11-10 revised to read as follows:</p> <p>"For COL applicants, in addition to meeting the acceptance criteria for the program elements described above, acceptable implementation milestones must be identified for operational programs. An acceptable implementation milestone for the 10 CFR 50.49 environmental qualification program for electrical, and I&C equipment located in a harsh environment is to have all qualification requirements met prior to the loading of fuel. Implementation is required by a license condition.</p> <p>2) Technical Rationale, Item 10, last sentence revised to read as follows:</p> <p>"The 10 CFR 50.49</p>

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	<p>environments. Based on these considerations the NUGEQ assumes the operative text regarding the need for a 50.49 operational program is in 50.49(a) which states:</p> <p>“Each holder of or an applicant for a license for a nuclear power plant, other than a nuclear power plant for which the certifications required under § 50.82(a)(1) have been submitted, shall establish a program for qualifying the electric equipment defined in paragraph (b) of this section.” (emphasis added).</p> <p>In addition, it appears that these SRP 3.11 items, particularly Item #11 on page 3.11-15, incorrectly conclude that all the environmental qualification activities described in SRP 3.11 are elements of this operational program. This appears contrary to the SECY and NEI information that limits the operational program to 10 CFR 50.49 environmental qualification. Based on these considerations the NUGEQ recommends revising item #20, item #15, and item #6 as follows:</p> <p>Item #20 revised to read:</p> <p>“For COL applicants, in addition to the meeting the acceptance criteria for the program elements described above, acceptable implementation milestones must be identified for operational programs. An acceptable implementation milestone for the 10 CFR 50.49 environmental qualification program for certain electrical equipment located in a harsh environment is to have all qualification requirements met prior to the loading of fuel.</p> <p>Item #11 – last sentence revised to read:</p>	<p>electrical equipment located in a harsh environment was identified as an operational program in that memo.”</p> <p>3) Item #6 - first paragraph revised to read:</p> <p>“For a COL application, the staff reviews the description of the 10 CFR 50.49 environmental qualification program for certain electrical equipment located in harsh environments and the proposed implementation milestones.”</p>	<p>3) Agree</p> <p>This is item # 5.</p>	<p>environmental qualification for electrical and I&C equipment located in a harsh environment was identified as an operational program in that memo.”</p> <p>3) Item 5 of Review Procedures revised to read as follows:</p> <p>“For a COL application, the staff reviews the requirements of the 10 CFR 50.49 environmental qualification program for electrical and I&C equipment located in harsh environments and the proposed implementation milestones.”</p>

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	<p>"The 10 CFR 50.49 environmental qualification program for certain electrical equipment located in a harsh environment was identified as an operational program in that memo."</p> <p>Item #6 - first paragraph revised to read: "For a COL application, the staff reviews the description of the 10 CFR 50.49 environmental qualification program for certain electrical equipment located in harsh environments and the proposed implementation milestones."</p>			
XV.	<p>Central Environmental Qualification File</p> <p>SRP 3.11 in numerous locations provides guidance on qualification records and files, including a "central file". Collectively this guidance generally reflects current industry practice and staff positions associated with 10 CFR 50.49 records/files but uses incorrect terminology and does not accurately reflect such practices and positions for mild environment equipment or mechanical equipment in harsh environments.</p> <p>For electrical equipment located in a harsh environment, 10 CFR 50.49(d)11 requires a list of covered electric equipment and an auditable file that includes accident-related environmental conditions, electrical characteristics, and equipment performance specifications. The list and file must be kept current and retained in an auditable form throughout the plant life. No similar regulatory requirements exist for mild environment equipment or mechanical equipment in harsh environments. The most applicable requirement is 10 CFR Part 50, Appendix B, Criterion XVII, Quality Assurance Records. It is</p>	<p>1) Item 4B page 3.11-3: Replace "An audit of the applicant's central file, including a review of the documentation provided in the file to demonstrate tangible evidence of qualification." with "An audit of the applicant's records, including a review of the documentation used to demonstrate tangible evidence of qualification."</p>	<p>1) Agree</p>	<p>1) Item 4B on page 3.11-3 revised appropriately to read as follows:</p> <p>"An audit of the applicant's records, including a review of the documentation provided in the file to permit verification of the environment design and qualification for all mechanical, electrical and I&C equipment covered by this SRP section. The staff's review is performed to determine (1) proper implementation of criteria established in the CP review, and (2) adequate environmental design and qualification for all electrical, mechanical and I&C equipment covered by this SRP section."</p>

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	<p>reasonable to infer for this equipment that sufficient environmental design and qualification records must be retained in an auditable form to furnish evidence that this equipment,, pursuant to GDC 4, is designed to accommodate the effects of and to be compatible with applicable environmental conditions.</p> <p>In contrast, SRP 3.11 appears to make no distinction between the record requirements for any of these classes of equipment (harsh electrical, harsh mechanical, and mild electrical/mechanical). Its guidance appears to specify a central file for all classes of equipment. This is inconsistent with applicable regulations and guidance, including 50.49 and Regulatory Guide 1.89 Rev.1. SRP 3.11 Item 4B page 3.11-3 discusses an applicant's central file which contains tangible evidence of "environmental qualification for all mechanical and electrical equipment covered by this SRP section." (emphasis added) Similarly Item #2 on page 16 discusses the staff audit of "the qualification files at the applicant's central storage location." Importantly, although a central file was specified in the proposed 50.4912 it was removed in the final rule. The SOC accompanying the final rule described this change as follows:</p> <p>Issue: The requirement for a central file should be deleted since it is not cost effective and has no safety benefit. Response: The Commission agrees. This requirement has been subject to different interpretations. A record of qualification must be maintained in an "auditable form" but not necessarily in a central file for the entire period during which the covered item is installed in a nuclear power plant. Record keeping requirement</p>	<p>2) Item 2 page 3.11-16: Delete " , and maintained at a central location," in 2nd paragraph.</p> <p>3) In the 3rd paragraph replace "applicant's qualification file" with "applicant's qualification file or records" and replace "audit the qualification files at the applicant's central storage location" with "audit the applicant's qualification files</p>	<p>2) Agree</p> <p>3) Agree</p>	<p>2) 2nd paragraph, Item 2 on page 3.11-14 revised to read as follows:</p> <p>"At the time of the OL application, the reviewer confirms that complete records are retained at a facility in an auditable and readily accessible form, which describe the environmental design and qualification method used for all mechanical, electrical, and I&C equipment in sufficient detail to document the degree of compliance with the requirements discussed herein. The reviewer also confirms that, thereafter, such records will be updated and maintained current as equipment is replaced, tested, or otherwise qualified."</p> <p>3) 3rd paragraph in Item 2 revised to read as follows:</p> <p>"To confirm the extent to which the equipment meets the requirements of Subsection II, the staff audits</p>

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	<p>of 10 CFR Part Appendix B must be met. Certain records can be kept at the vendor's shop."</p> <p>In addition to the central file problem, the SRP is unclear regarding differences in the types of records that apply to the different equipment classes. The following summarizes current accepted industry practice and NRC staff positions regarding such records.</p> <p>For electrical equipment in a harsh environment compliance with 50.49 requires an equipment list and qualification files that include the information specified in 50.49(d)(1), (2), and (3).</p> <p>For mechanical equipment in a harsh environment compliance with the GDC 4 requirement that the design of equipment be compatible with and accommodate the effects of applicable environmental conditions, including accident conditions, is generally achieved through the evaluation of non-metallic components/parts (e.g., seals, gaskets, lubricants, fluids for hydraulic systems, and diaphragms). Appropriate documentation of this evaluation in accordance with 10 CFR Part 50, Appendix B, Criterion XVII, Quality Assurance Records, is necessary. However, environmental qualification files, per se, are not required for mechanical equipment in a harsh environment.13</p> <p>For electrical and mechanical equipment in a mild environment compliance with the GDC 4 requirement that the design of equipment be compatible with and accommodate the effects of applicable environmental conditions is generally achieved through incorporation of the appropriate environmental conditions into the design and</p>	<p>and records."</p>		<p>the environmental design and qualification files and records, and conducts a plant site review. For selected equipment, the staff reviews the test procedure and test results, and examines the equipment configuration and mounting, and then determines whether the test or analysis referenced demonstrates compliance with the established criteria. The staff may require that component evaluation worksheets for all equipment be submitted to the staff. After the visit, the applicant may be required to submit certain selected documents and reports for further staff review. If the staff has reviewed an applicant's environmental design and qualification files and records for a previous application, they may elect not to require the applicant to submit all the qualification summary data sheets, but instead elect to audit the environmental design and qualification files and records."</p>

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	<p>procurement specifications. Appropriate documentation of the proper incorporation of environmental conditions in accordance with 10 CFR Part 50, Appendix B, Criterion XVII, Quality Assurance Records, is necessary. However, environmental qualification files, per se, are not required.</p> <p>To resolve SRP inconsistency with Commission guidance regarding a central file and to provide appropriate guidance regarding differences in the type of records among the equipment classes, the NUGEQ recommends the following:</p> <p>Item 4B page 3.11-3: Replace “An audit of the applicant’s central file, including a review of the documentation provided in the file to demonstrate tangible evidence of qualification.” with “An audit of the applicant’s records, including a review of the documentation used to demonstrate tangible evidence of qualification.”</p> <p>Item 2 page 3.11-16: Delete “, and maintained at a central location,” in 2nd paragraph. In the 3rd paragraph replace “applicant’s qualification file” with “applicant’s qualification file or records” and replace “audit the qualification files at the applicant’s central storage location” with “audit the applicant’s qualification files and records.”</p> <p>Implementation page 3.11-19: Replace “Each plant is required to have a complete environmental qualification file that demonstrates compliance with this review plan (or uses established bases for alternate requirements) before submittal of an OL application.” With “Each plant is required to have complete environmental qualification records, including an</p>	<p>4) Implementation page 3.11-19: Replace “Each plant is required to have a complete environmental qualification file that demonstrates compliance with this review plan (or uses established bases for alternate requirements) before submittal of an OL application.” With “Each plant is required to have complete environmental qualification records, including an environmental qualification file for 10 CFR 50.49 equipment, that demonstrate compliance with this review plan(or uses established bases for alternate requirements) before submittal of an OL application.”</p>	<p>4) Agree</p>	<p>4) The 2nd last paragraph of Section V IMPLEMENTATION revised to read as follows:</p> <p>“Each plant is required to have complete environmental design and qualification records, including an environmental qualification file for 10 CFR 50.49 equipment, that demonstrate compliance with this review plan (or uses established bases for alternate requirements) before submittal of an OL application.”</p>

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	environmental qualification file for 10 CFR 50.49 equipment, that demonstrate compliance with this review plan(or uses established bases for alternate requirements) before submittal of an OL application."			
XVI.	<p>Environmental Qualification for Mechanical Equipment in a Harsh Environment\</p> <p>The NUGEQ disagrees with the statement in Item #1 on page 3.11-6 that the NUREG- 0588 "criteria are general in nature and can also be applied to mechanical equipment." We assume the observation was intended to be limited to mechanical equipment in harsh environments but even in this limited case the guidance in NUREG-0588 Category 1 is inappropriate. The most relevant NUREG-0588 guidance for qualification of mechanical equipment in harsh environments relates to acceptable methods for establishing accident environmental conditions. However, much of this guidance is superceded by similar guidance in Regulatory Guide 1.89 Rev. 1. Most of the other NUREG-0588 guidance, including qualification methods and documentation are not applicable to the material evaluation that establishes environmental qualification for mechanical equipment in a harsh environment. As correctly stated elsewhere in SRP 3.11 (see Item #18 on page 3.11-1114), equipment qualification for mechanical equipment in a harsh environment is generally limited to an evaluation of those materials that are sensitive to environmental effects (e.g., seals, gaskets, lubricants, fluids for hydraulic systems, and diaphragms). In summary, such an evaluation identifies nonmetallic subcomponents, applicable environmental conditions, and evaluates the</p>	<p>1) Delete the following sentence in Item #1 on page 3.11-6: "These criteria are general in nature and can also be applied to mechanical equipment."</p> <p>2) The NUGEQ recommends deleting the following sentence in the first paragraph of Item #2 on page 3.11-7: "Although specifically written for Class 1E electric equipment, IEEE Std 323 is considered applicable to the environmental qualification of other types of equipment."</p>	<p>1) Agree</p> <p>2) Agree</p>	<p>1) See changes made to resolve comment VI - 1. See SRP Acceptance Criteria 1.</p> <p>2) The requested deletion made. See SRP Acceptance Criteria 2.</p>

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	<p>environmental effects on the material/component capabilities. Further, the NRC's position set forth in its evaluation of a current operating plant's approach regarding elimination of a separate program for environmental qualification of mechanical equipment in harsh environments and provides appropriate direction for clarification of this SRP discussion, and in particular the conclusion that "maintaining compliance with GDC-4 through the Procurement, Maintenance and Surveillance Programs ... would be acceptable...."15</p> <p>The NUGEQ recommends deleting the following sentence in Item #1 on page 3.11-6: "These criteria are general in nature and can also be applied to mechanical equipment."</p> <p>The NUGEQ questions the meaning of the term "other types of equipment" in the following statement on page 3.11-7: "Although specifically written for Class 1E electric equipment, IEEE Std 323 is considered applicable to the environmental qualification of other types of equipment." If by "other types of equipment" the NRC means mechanical equipment then we disagree with the usefulness of this statement within the SRP 3.11 context. The NUGEQ believes that this SRP statement may have originated when there was less consensus regarding the methods used to address environmental considerations for mechanical equipment. Today for both harsh and mild environment mechanical equipment there is a well defined process described in SRP 3.11 and approved in recent SERs including NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design." As noted elsewhere in these comments</p>			

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	<p>this involves evaluating the capabilities of non-metallic materials/parts for mechanical equipment in harsh environments and integrating applicable environmental conditions into the design and procurement specifications for mechanical equipment in mild environments. IEEE 323 1974 contains little applicable guidance regarding these activities.</p> <p>The NUGEQ recommends deleting the following sentence in the first paragraph of Item #2 on page 3.11-7: "Although specifically written for Class 1E electric equipment, IEEE Std 323 is considered applicable to the environmental qualification of other types of equipment." The NUGEQ disagrees with this statement and recommends that it be deleted.</p>			
XVII	<p>Confusing Review Interface Guidance</p> <p>The NUGEQ recognizes that the staff must establish its own review interfaces, and that those interfaces may change over time as a result of, for example, agency reorganization. However, a quick review indicates that much of the guidance related to the review interfaces appears to lack sufficient clarity to assure adequately defined review responsibilities that would allow for a timely and efficient review process. Accordingly, we provide these comments for the staff's consideration and urge clarity in this area in order to facilitate the review process.</p>	<p>1) Review Interface items : #8 and #10 contain no reference to other SRP sections.</p>	<p>1) Agree</p> <p>Item 8 is now item 6 and provided interface reference to SRP section 9.4.5. Item 10 is now in items 8 and 9 and SRP section references provided as 15.0.3 and 6.5.2 respectively.</p>	<p>1) Review Interface Item 8 revised to delete reference to I&C equipment and sensing lines, and incorporated into Review Interface Item 6 (see resolution to comment XVII-3).</p> <p>Review Interface Item 10 separated into items 8 and 9 and provided reference SRP Sections 15.0.3 and 6.5.2.</p>

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	<p>In sum, the NUGEQ believes a significant amount of the staff reviewer guidance in SRP 3.11 Review Interface is confusing, contradictory, and potentially misplaced. According to LIC200 the Review Interface should describe how other SRP sections interface with this section and how the evaluations are related to each other. Further, the specific acceptance criteria and review procedures are to be contained in the referenced SRP sections. According to LIC200, specific guidance for review of the contents of SRP 3.11 should be contained in III. REVIEW PROCEDURES. This LIC200 guidance clearly indicates that all Review Interface items must reference other SRP sections and all SRP3.11 reviewer guidance should be in III. REVIEW PROCEDURES. The following are examples of problems in SRP 3.11, principally in Review Interface. Note - the NUGEQ has not had sufficient time to thoroughly comment on this topic.</p> <p>1. Review Interface items : #8 and #10 contain no reference to other SRP sections.</p> <p>2. A review Interface item does not exist for (1) protection of electric and mechanical equipment against other natural phenomena and external events and (2) equipment functional performance during and after exposure to conditions resulting from a 100% fuel-clad metal-water reaction. Both items are outside the scope of SRP 3.11:</p> <p>3. Several Review Interface items (#3, #4, #5, #6, and #7) specify that specific system reviews under other SRP sections (e.g., instrument and controls in SRP 7) confirm that: (1) the SAR identifies each item of equipment described in</p>	<p>2) A review Interface item does not exist for (1) protection of electric and mechanical equipment against other natural phenomena and external events and (2) equipment functional performance during and after exposure to conditions resulting from a 100% fuel-clad metal-water reaction. Both items are outside the scope of SRP 3.11:</p>	<p>2) Agree</p>	<p>2) The following new Review Interface items added:</p> <p>Item 10.C. The design bases for protection of mechanical and electrical equipment against natural phenomena and external events, are reviewed under appropriate sections of SRP Chapter 3 (e.g., 3.3.1, 3.3.2, 3.4.1, 3.5.1.1, 3.5.1.4, 3.5.1.5, and 3.5.2). SRP Section 3.10 includes seismic and dynamic qualification of mechanical and electrical equipment.</p> <p>Item 11. "Review of the adequacy of equipment functional performance during and after being exposed to the environmental conditions resulting from the release of hydrogen generated by the equivalent of a 100% fuel-clad metal-water reaction, as stated in 10 CFR 50.44 ©, is performed under SRP Section 6.2.5."</p> <p>(See response to comment III - 7)</p>

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	<p>Subsection I, Item 1, of this SRP section, (2) the validity of the descriptions of anticipated operational occurrences, and normal, accident, and post-accident environments provided in the SAR for this equipment, and (3) the acceptability of the values provided in the SAR for the length of time that the equipment is required to operate under accident environments. However, it appears that the review procedures in these referenced sections do not specify such reviews. We base this conclusion on a review of SRP 6.5.2 (referenced in item #7) which contains no discussion or confirmation of anticipated operational occurrences, environmental conditions, SAR identification of each equipment item in SRP 3.11 Subsection I #1, or equipment required operating times. NUGEQ notes that SRP 3.11 III. REVIEW PROCEDURES, Items #1 and #2 suggest that the SRP 3.11 reviewers (primary and secondary) do “review” the SRP 3.11 identification of normal, accident, and post-accident environmental conditions; anticipated operational occurrences; required operating time; and chemical, submergence conditions and verify that the system list, including the equipment list, is consistent with Subsection I, Item 1. The NUGEQ recommends that the NRC resolve this confusing guidance about who does these reviews and under what SRP section. It may be appropriate to delete Review Interface items #3, #4, #5, #6, and #7 and include statements in REVIEW PROCEDURES, Items #1 and #2 that the reviewers of other SRP sections (list applicable sections) are consulted regarding certain topics (list topics).</p> <p>4. Review Interface item #3 specifies that review</p>	<p>3) The NUGEQ recommends that the NRC resolve this confusing guidance about who does these reviews and under what SRP section. It may be appropriate to delete Review Interface items #3, #4, #5, #6, and #7 and include statements in REVIEW PROCEDURES, Items #1 and #2 that the reviewers of other SRP sections (list applicable sections) are consulted regarding certain topics (list topics).</p> <p>4) The NUGEQ questions why the containment and containment system reviewers are responsible for confirming the location of all electrical and mechanical equipment (both inside and outside containment) within the scope of SRP 3.11. The NUGEQ recommends that the NRC resolve this apparently confusing guidance. It may be appropriate to delete this portion of Interface Item #3 and include guidance in REVIEW PROCEDURES, regarding confirming the location of all electrical and mechanical equipment (both inside and outside containment) within the scope of SRP 3.11, including the need to consult reviewers of other SRP sections (list sections).</p>	<p>3) Agree</p> <p>4) Disagree</p> <p>The comment correctly notes that Review Interface item 3 specifies that review under SRP Sections 6.2.1 - 6.2.6 “confirms that the SAR identifies the location of each equipment described in Section I, Item 1, of this SRP section. The correct interpretation is that the reviewer confirms that the necessary information is contained in the SAR. It does not mean that the containment and containment system reviewers are responsible for confirming the location of all electrical and</p>	<p>3) The guidance in Review Interfaces 1-12 revised to provide a clearer description of the reviews performed.</p> <p>4) Review Interface Item 1 revised for clarity as follows:</p> <p>“Review of the adequacy of the design, installation, inspection, and testing of containment systems is performed under SRP Sections 6.2.1 through 6.2.6.”</p>

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	<p>under SRP Sections 6.2.1 - 6.2.6, in addition to the activities discussed above, "confirms that the SAR identifies the location of each item of equipment described in Subsection I, Item 1, of this SRP section, both inside and outside the containment. Inside the containment, the location must be specified, whether inside or outside of the missile shield for pressurized-water-reactor (PWR) plants, or whether inside or outside of the drywell for boiling-water-reactor (BWR) plants." The NUGEQ questions why the containment and containment system reviewers are responsible for confirming the location of all electrical and mechanical equipment (both inside and outside containment) within the scope of SRP 3.11. We suspect that the 1996 SRP 3.11 draft contributed to this problem – it specified SCSB review of this information. The similar 1981 version identified the ASB and CSB as the reviewers of all such equipment. The NUGEQ recommends that the NRC resolve this apparently confusing guidance. It may be appropriate to delete this portion of Interface Item #3 and include guidance in REVIEW PROCEDURES, regarding confirming the location of all electrical and mechanical equipment (both inside and outside containment) within the scope of SRP 3.11, including the need to consult reviewers of other SRP sections (list sections).</p> <p>5. Review Interface Item #11 page 3.11-5 represents additional confusing guidance when it specifies that the organization responsible for reviewing the containment spray system reviews all the bolting and thread fasteners under SRP Section 3.13 Draft Rev. 0 - April 1996, including "mounting and bolting details equivalent to those used for equipment qualification." Similar</p>	<p>5) The NUGEQ recommends deleting Item #11 since harsh environmental qualification typically evaluates and justifies differences in orientation and mounting manner if the equipment's performance is affected by these differences and more detailed considerations regarding fastener design, materials, and stresses are typically limited to seismic and dynamic qualification (SRP 3.10).</p> <p>6) The NUGEQ suggests the NRC consider dividing this item into two items. One would address environments associated with loss of required HVAC systems and another (if needed) for instrument sensing line heat tracing (with an appropriate reviewer).</p>	<p>mechanical equipment (both inside and outside containment) within the scope of SRP 3.11.</p> <p>5) Agree</p> <p>6) Agree</p>	<p>5) The requested deletion made. Item # 11 deleted.</p> <p>6) Review Interface Item 8 revised to delete reference to I&C equipment and sensing lines. (see resolution to comment XVII-1 & 3).</p> <p>Item 6 includes interface for loss of ventilation systems.</p>

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	<p>6. Review Interface Item #8 page 3.11-4 provides confusing guidance which specifies that the organization responsible for I&C equipment is responsible for confirming the environmental descriptions resulting from loss of environmental control systems (heat tracing, ventilation, heating, air conditioning), for those areas that contain equipment and instrument sensing lines that rely on heat tracing for freeze protection. No SRP sections are referenced for this item. This seemingly illogical guidance (why are the I&C personnel responsible for confirming loss of HVAC environments) is similar to 1996 draft language and is evidence of problems arising from relying on the 1996 draft as the official version.</p> <p>The original 1981 SRP-3.11 guidance, which makes sense, states; "With regard to the environments resulting from loss of environmental control systems (ventilation, heating, air conditioning), the ASB will confirm the description of these environments as provided in the SAR for those areas which contain equipment including electrical control and instrumentation equipment." This more appropriate guidance tasks HVAC knowledgeable reviewers with verifying the environmental conditions resulting from loss of HVAC systems, with the apparent purpose of using those conditions for qualification. The NUGEQ notes that even this version does not indicate if such conditions should be considered as part of the design for electrical equipment in the area. Although not discussed in SRP 3.11, we assume that the loss of redundant safety-related HVAC is not generally considered part of the design basis.¹⁶ Unfortunately, the 1996 revision by</p>	hydrodynamic forces.		

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	<p>including heat tracing and freeze protection can also be interpreted to change the entire meaning of the guidance. Now the guidance can be read to apply solely to conditions resulting from equipment relied on for freeze protection. The more appropriate intended meaning of the 1981 version could be totally lost. Finally, the NUGEQ questions the need to include piping (sensing lines) within the scope of SRP 3.11. The NUGEQ suggests the NRC consider dividing this item into two items. One would address environments associated with loss of required HVAC systems and another (if needed) for instrument sensing line heat tracing (with an appropriate reviewer).</p> <p>7. Further, regarding instrument sensing line freeze protection, SRP 3.11 contains reviewer guidance (inappropriately) in ACCEPTANCE CRITERIA Item #10 page 3.11-9. This item indicates that the guidance in a regulatory guide on instrument sensing lines (RG 1.151) contains ACCEPTANCE CRITERIA for SRP 3.11. It also provides reviewer guidance (this guidance should be in III. REVIEW PROCEDURES) to confirm that the applicant has identified any safety related sensing lines that rely on heat tracing and ensured that the associated control equipment is included in the environmental qualification program. Reference to RG 1.151 in SRP 3.11 first appeared in the 1996 draft. NUGEQ believes this guidance should have been in SRP 7 rather than SRP3.11.17 Nonetheless, at least the 1996 reviewer guidance was to “assure that adequate redundancy and other appropriate measures have been implemented, to preclude inadvertent effects caused by adverse conditions.” This contrasts significantly with the Proposed SRP 3.11 which instead specifies inclusion of the</p>			

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	<p>control equipment in the environmental qualification program. Finally, this significant change is not highlighted as a change in the proposed SRP 3.11 version.</p> <p>8. Review Interface Items #1, #2, and #12 contain overlapping guidance. The NUGEQ suggests the NRC revise these items and establish separate items for (1) SRP sections responsible for seismic and dynamic qualification, (2) SRP sections responsible for functional design of mechanical equipment, and (3) SRP sections responsible for adverse flow effects and vibration caused by acoustic resonances and hydrodynamic forces.</p>			
XVIII	<p>SRP 3.11 Revision Control and Justification for Changes</p> <p>As a matter of process clarity and consistency, and recognizing the importance of adequately defining the nature of changes to the prior SRP revision in order to assure proper internal NRC review, the NUGEQ also evaluated the nature of the new and changed staff positions reflected in this proposed revision of SRP 3.11 and compared those with what appears to be the controlling NRC guidance for SRP revision.</p> <p>Our review suggests that, contrary to the guidance in LIC200 Rev. 1, "Standard Review Plan (SRP) Process", the proposed SRP 3.11 revision only highlights significant changes (but</p>	<p>1) Our review suggests that, contrary to the guidance in LIC200 Rev. 1, "Standard Review Plan (SRP) Process", the proposed SRP 3.11 revision only highlights significant changes (but not all changes) from the prior 1996 draft version. LIC200 specifies that changes from the last formal version (i.e., 1981) including text from the 1996 draft be highlighted</p> <p>2) The NUGEQ concludes that these additions constitute new staff positions, that the staff should revise statements that SRP 3.11 contains no new staff positions,</p>	<p>1, 2, 3) Disagree</p> <p>LIC-200 is an internal NRC Office Instruction that, in part, provides guidance to the staff for maintaining and modifying existing SRP sections, and adding new SRP sections. This document is revised, as needed, based on lessons learned to improve the guidance provided and make the SRP revision process more efficient and</p>	<p>SRP 3.11 was revised based on these comments as follows:</p> <p>NUGEQ reviewed the proposed SRP 3.11 Revision 3 and provided comments and recommended changes by letter dated Feb. 09, 2007.</p> <p>The necessary changes made based on NUGEQ recommendations appropriately throughout SRP 3.11.</p>

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	<p>not all changes) from the prior 1996 draft version. LIC200 specifies that changes from the last formal version (i.e., 1981) including text from the 1996 draft be highlighted. In this proposed SRP section the staff does not identify and justify changes between the 1981 and 1996 version. SRP 3.11 in "Description of Changes" page 3.11-A-1 simply states that "This SRP section affirms the technical accuracy and adequacy of the guidance previously provided in (Draft) Revision 3, dated April 1996 of this SRP." The NUGEQ believes this is contrary to the guidance in LIC-200.</p> <p>Also contrary to LIC-200 the staff has apparently concluded that endorsement of the 1996 draft does not represent new staff positions because the draft has been used by the staff and stakeholders (e.g., new reactor design certification reviews and Review Standards RS-001 and RS-002).¹⁸ The NUGEQ questions the adequacy of this conclusion particularly with respect to SRP 3.11. The NUGEQ has not conducted an exhaustive search of available documents to determine the specific cases where applicants and the NRC staff have used the 1996 draft version of SRP 3.11 in lieu of the last formal version (Revision 2 in 1981). However, the applicant and the NRC staff did use SRP 3.11 Rev. 2 and not the 1996 draft for the AP1000 SER (see NUREG-1793, Vol. 1, page 3-251) which was completed in 2004.¹⁹ Further, we do not believe efforts associated with RS-001 and RS-002 involved significant reliance on SRP 3.11.²⁰ Setting aside this question about the status of the 1996 draft, it appears that the staff has incorrectly concluded that the proposed SRP 3.11s represents no new staff positions since the</p>	<p>and the review and approval process for SRP 3.11 should conform with NRC procedures for SRP sections with new staff positions (i.e., LIC200 Type 2).</p> <p>3) As described further in our other comments, the NUGEQ believes that a number of changes made in the 1996 draft, that did not benefit from close public or regulatory review but have now been deemed – contrary to LIC200 - to represent current staff positions during the SRP 3.11 update, have contributed to many of the problems with the proposed SRP section.</p>	<p>tractable. The latest SRP revision process represents a similar effort was initiated in 1996 (draft). During the latest SRP revision process, the changes proposed in 1996 were reviewed and modified as necessary. The intent of the guidance in LIC 200 is to provide an effective and efficient SRP revision process, the staff does not consider the approach taken to be contrary to the guidance in LIC-200.</p> <p>Further, the staff does not believe that this revision of SRP 3.11 presents any new staff positions with regard to the regulations or requirements for environmental qualification. In the NUGEQ comments citing new positions, information was provided based on operating experience to clarify and provide guidance on methods acceptable to the staff in meeting existing regulations and requirements, or in implementing standards endorsed by the staff,</p>	<p>SRP 3.11 Revision 3 was streamlined and provided clarifications based on the NUGEQ comments.</p>

No.	NUGEQ Comment	NUGEQ Recommended Change	NRC Staff Resolution	Changes Made to SRP 3.11
	<p>1996 version (i.e., SRP 3.11 meets the Type 1 definition in LIC200). In the NRC TRANSMITTAL memorandum for the proposed revision to SRP 3.11 the staff states; "The staff has determined that the changes do not involve any new staff positions."21 In NUGEQ comment - New SRP 3.11 Positions Since 1996 Draft Version – we identified several additions to SRP 3.11 since the 1996 version. These additions, particularly those referencing an Information Notice as the source document reflect new staff positions since the 1996 version. LIC200 when describing Type 2 revisions (i.e., new staff positions) indicates that such changes include those derived from source documents that have not received public comment or the appropriate NRC office approvals. It states that: "An example of such a document would be one setting forth operating experience." The NUGEQ concludes that these additions constitute new staff positions, that the staff should revise statements that SRP 3.11 contains no new staff positions, and the review and approval process for SRP 3.11 should conform with NRC procedures for SRP sections with new staff positions (i.e., LIC200 Type 2).</p> <p>As described further in our other comments, the NUGEQ believes that a number of changes made in the 1996 draft, that did not benefit from close public or regulatory review but have now been deemed – contrary to LIC200 - to represent current staff positions during the SRP 3.11 update, have contributed to many of the problems with the proposed SRP section. In many cases the unreviewed 1996 language forms the basis for further conflicting and erroneous guidance to applicants and reviewers that is both internally inconsistent and</p>		<p>such as IEEE Std.-323. Consequently, the staff considers these changes to be Type 1 changes in accordance with the guidance in LIC-200. Additional detail is provided in the responses to the specific comments.</p> <p>The problems identified in the examples are addressed in appropriate sections of SRP.311.</p>	

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	<p>inconsistent with other regulatory guidance. Examples of problems with the SRP 3.11 1996 draft include but are not limited to (1) applicable regulatory basis and equipment requirements for beyond-design-basis hydrogen burn environments, (2) applicable SRP sections for review and guidance regarding GDC 2 and natural phenomena, (3) 50.49 exemptions for new revisions of Regulatory Guide 1.97, and (4) incorporation of instrument sensing line freeze protection and Regulatory Guide 1.151 into the review scope of SRP 3.11.</p>			