

Attachment 2

**APPENDIX A  
NRC REGULATORY POSITION  
ON ASME PRA STANDARD**

## APPENDIX A: NRC REGULATORY POSITION (***PRELIMINARY***) ON ASME PRA STANDARD

The staff has reviewed ASME RA-S-2002 (“Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications,” April 5, 2002). The staff’s position on the standards (requirements) contained in this document are:

- No objection: the staff has no objection to the requirement for probabilistic risk assessment (PRA) to be used to support risk-informed decisions for commercial nuclear power plants, and which also prescribe a method for applying the requirements for specific applications.
- No objection with clarification: the staff has no objection to the requirement for probabilistic risk assessment (PRA) to be used to support risk-informed decisions for commercial nuclear power plants, and which also prescribe a method for applying the requirements for specific applications. However, certain requirements, as written, are either unclear or ambiguous and therefore, the staff has provided their understanding of these requirements.
- No objection subject to the following qualification: the staff has a technical concern with the requirement and has provided a qualification to resolve the concern.

### NOTE:

This is still a work in progress and only reflects staff preliminary views. The staff regulatory position may change, description of the issues not necessarily optimally written or may change, and proposed resolution may change.

Position listed as “ASME” -- the staff has no objection, however, believes the requirement, as written, is either extraneous, overly excessive, or could be better written. These will not be included in the Appendix, but will be submitted to ASME for their consideration (as will be the clarifications and qualifications).

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
<u>Chapter 1</u>			
1.1	<ul style="list-style-type: none"> <li>The standard is only for current generation LWRs, the requirements may not be sufficient or adequate for other types of reactors</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“This Standard sets forth requirements for PRAs used to support risk-informed decisions for commercial light water reactor nuclear power plants, and prescribes a method for applying these requirements for specific applications (<b><i>additional or revised requirements may be needed for more advanced reactor designs</i></b>).”</li> </ul>
1.2 - 1.7	-----	No objection	-----
Table 1.3-1	-----	No objection	-----
<u>Chapter 2</u>			
2.1	-----	No objection	-----
2.2			

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
Accident sequence	<ul style="list-style-type: none"> <li>The definition provided is very general and does not distinguish the different types of accident sequences developed in a PRA. This distinction is necessary because some of the SRs are dependent on the accident sequence type.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><b><i>accident sequence, a representation in terms of an initiating event followed by a sequence of failures or successes of events (such as system, function, or operator performance) that can lead to undesired consequences, with a specified end state (e.g., core damage or large early release).</i></b> A representation in terms of an initiating event followed by a combination of system, function, and operator failures or successes, of an accident that can lead to undesired consequences, with a specified end state (e.g., core damage or large early release). An accident sequence may contain many unique variations of events (minimal cut sets) that are similar.</li> <li><b><i>accident sequence, class, a grouping of accident sequences by initiator type (e.g., LOCA, LOSP) or by similar functional loss (e.g., station blackout, loss of decay heat).</i></b></li> <li><b><i>accident sequence, functional, the sequence of events are represented by the key safety functions necessary to mitigate the effects of the initiating event.</i></b></li> <li><b><i>accident sequence, systemic, the sequence of events are represented by the front-line systems necessary to mitigate the effects of the initiating event.</i></b></li> <li><b><i>accident sequence, scenario, the sequence of events are represented by the specific components or trains, support systems and operator actions necessary to mitigate the effects of the initiating event.</i></b></li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
<p>Accident sequence, dominant</p>	<ul style="list-style-type: none"> <li>The first part of the definition provides little value and can be inaccurate, a large fraction may be outside the stated range (i.e., smaller or larger than 10 to 20). In addition, it is not clear what is meant by large fraction. The term “dominant” is also used to modify other events such as contributors, human events.</li> <li>Several different terms (modifiers) are used in the standard. In some places, these modifiers are used interchangeably (to have the same meaning) and in other places, they are used to convey different meanings. Specifically, these modifiers include: important, significant and dominant. In a generic sense, in the context of a PRA, these modifiers generally are indicating that the entity under question is a major factor to the outcome under consideration. In this general sense, these modifiers can be used interchangeably (e.g., an important sequence, a significant sequence, a dominant sequence). However, on a relative basis, particularly if these modifiers are used to distinguish whether a requirement is imposed, a common and specific understanding of these modifiers is needed.</li> </ul>	<p>Clarification</p>	<ul style="list-style-type: none"> <li><del><i>accident sequence, dominant</i></del>: an accident sequence that is usually represented by the top 10 or 20 events or groups of events modeled in a PRA and accounts for a large fraction of the core damage or large early release frequency.</li> <li><b><i>dominant, contributor</i></b>, an entity (a contributor or event such as failure of a specific piece of equipment, a human failure event, an accident sequence) that exercises the most influence or control to an outcome, and which is represented by a contribution on the order of <math>\geq 15-20\%</math></li> <li><b><i>significant, contributor</i></b>, an entity (a contributor or event such as failure of a specific piece of equipment, a human failure event, an accident sequence) that accounts for a fairly large amount of an outcome, and which is represented by a contribution on the order of <math>\geq 5-20\%</math> -- NOTE</li> <li><b><i>important, contributor</i></b>, an entity (a contributor or event such as failure of a specific piece of equipment, a human failure event, an accident sequence) that accounts for a noticeable amount to an outcome, and which is represented by a contribution on the order of <math>\geq 1-10\%</math> -- NOTE</li> </ul> <p>NOTE: it could be that “significant” and “important” be combined to have the same definition</p>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
Best estimate	<ul style="list-style-type: none"> <li>Best estimate, as defined, is never used in the standard. The term, as used in the standard (SC-B1), does not match the provided definition; the term is used to mean realistic which is already stated in the requirement (see SC-B1)</li> </ul>	Qualification	<ul style="list-style-type: none"> <li><del><i>best estimate</i>: the point estimate of a parameter that is not biased by conservatism or optimism. Generally, the best estimate of a parameter is represented as a mean value.</del></li> </ul>
key safety functions	<ul style="list-style-type: none"> <li>The functions listed are imprecise and redundant (e.g., core heat removal is redundant with both reactor coolant inventory control and reactor coolant heat removal) and other safety functions are missing.</li> </ul>	Qualification	<ul style="list-style-type: none"> <li>“...These include reactivity control, core heat removal, <b>reactor pressure control</b>, reactor coolant inventory control, reactor coolant heat removal, <b>decay heat removal</b>, and containment integrity in appropriate combinations...”</li> </ul>
large early release	<ul style="list-style-type: none"> <li>QHOs address both early and latent fatalities where LERF is used as a surrogate for the early fatality QHO, therefore, the definition needs to include the potential for early health effects.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“...of off-site emergency response and protective actions <b>such that there is a potential for early health effects.</b>”</li> </ul>
Significant	<ul style="list-style-type: none"> <li>This term is used in the standard to determine when and if to apply a requirement, as such it needs to be defined</li> </ul>	Qualification	
Skill of the craft	<ul style="list-style-type: none"> <li>this term is used in the standard and needs to be defined</li> </ul>	Qualification	<ul style="list-style-type: none"> <li><b><i>skill of the craft</i>: that level skill expected of the personnel performing the associated function</b></li> </ul>
unavailability	<ul style="list-style-type: none"> <li>Fraction of time is one method for calculating unavailability, not suitable for calculating such unavailabilities as failure on demand</li> </ul>	Qualification	<ul style="list-style-type: none"> <li>“The <b>probability</b> that a system or component is not capable of supporting its function...”</li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
Other definitions	-----	No objection	-----
<b>Chapter 3</b> No objection			
3.1 thru 3.6	-----	No objection	-----
<b>Chapter 4</b>			
4.1 - 4.2	-----	No objection	-----
4.3			
4.3	Reference to Appendix J	ASME	Should read "Appendix J of NUREG/CR - 1563."
4.3.1-4.3.2	-----	No objection	-----
4.3.3	<ul style="list-style-type: none"> <li>The use of the word "should" does not provide a minimum requirement</li> </ul>	ASME	<ul style="list-style-type: none"> <li>"The PRA analysis team <b><i>shall</i></b> use outside experts..."</li> </ul>
4.3.4-4.3.7	-----	No objection	-----
4.4	-----	No objection	-----
4.5	<ul style="list-style-type: none"> <li>The standard provides SRs for different PRA capabilities, but there is no requirement for the PRA to identify which capability category is met for each SR.</li> </ul>	Qualification	<ul style="list-style-type: none"> <li>"... a PRA will meet that HLR. <b><i>The capability category that has been met for each SR shall be identified and documented.</i></b> Boldface is used....in the three Capability Categories."</li> </ul>
4.5 Tables 4.5.1-2(d) 4.5.2-2(c) 4.5.3-2(c) 4.5.4-2(c) 4.5.5-2(i) 4.5.6-2(e) 4.5.7-2(f) 4.5.8-2(f) 4.5.9-2(g)	For all elements, inconsistent requirements regarding the documentation of the assumptions that can significantly impact the results, the basis of the assumptions and the impact to the results.	ASME	

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
4.5.1 - IE			
4.5.1.1	-----	No objection	-----
Table 4.5.1-1	-----	No objection	-----
Tables 4.5.1-2(a) thru 4.5.1-2(d)			
IE-A1,A3,A7, A8, A9,A10	-----	No objection	-----
IE-A2	<ul style="list-style-type: none"> <li>There is no definition of “active components,” as such the requirement is unclear and too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“(c) ISLOCAs: INCLUDE postulated events representing active components (<b><i>i.e., components that will need to change state</i></b>) in systems interfacing with the reactor coolant system...”</li> </ul>
IE-A4	<ul style="list-style-type: none"> <li>As written, the distinction between Cat II and III could be taken to mean that only those initiating events resulting from failures of complete systems as opposed to single trains of systems need be considered.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>Cat II: “USE a structured approach .... to assess and document the possibility of an initiating event resulting from <b><i>individual</i></b> systems or <b><i>train failures</i></b>.”</li> </ul>
IE-A5	<ul style="list-style-type: none"> <li>As written, there is an implication that more work is needed in (a): not every event that occurs at other than at-power operation should be incorporated</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“...INCORPORATE (a) events that have occurred at condition other than at-power operation (i.e., during low power or shutdown conditions, <b><i>unless it is determined that an event is not applicable to at-power operation.</i></b> (b) events....”</li> </ul>
IE-A6	<ul style="list-style-type: none"> <li>As written, there is an implication that more work is needed for Cat II than for Cat III, since it is not clear whether the interviews from other plants are to be used instead of or as a complement to plant specific interviews. However, interviewing other plants would appear to be more resource intensive.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>Cat II: “INTERVIEW plant operations, ... to determine if potential initiating event have been overlook.” <del>Information from interviews conducted at similar plants may be used.</del></li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
IE-A9	<ul style="list-style-type: none"> <li>misplaced: related to IE-B (grouping) and IE-C (quantification)</li> <li>Inconsistent for Capability Category I with IE-A2, and for Capability Category II with IE-A6.</li> </ul>	ASME	
IE-B2,B3,B4	-----	No objection	-----
IE-B1	<ul style="list-style-type: none"> <li>For the functional IE categories and quantification IE categories, as written, it is implied that two different groupings are performed. Therefore two different sets of accident sequences would need to be developed and quantified. In addition, the definitions provided are too limiting, other IE categories can exist for grouping.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“...in the Quantification element (para.4.5.8). <del>Functional initiating event categories refer to initiating events grouped for the purpose of accident sequence definition, while quantification initiating event categories refer to those grouped for separate quantification of the accident sequences.</del> When initiating events are not grouped for either of these purposes, PROVIDE a separate accident-sequence evaluation for each selected initiating event.”</li> </ul>
IE- C2, C3, C6, C7 C10,C11	-----	No objection	-----
IE-C1	<ul style="list-style-type: none"> <li>As written, there appears to be an internal inconsistency -- SR requires the “USE of the most recent data” then requires justification to exclude “data from the initial year of commercial operation. Further in IE-C5, SR requires justification of “exclusion of earlier years”</li> <li>It is not clear what is an acceptable justification for deviating from the standard, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“...USE the most recent applicable data to quantify the initiating event frequencies. <b>JUSTIFY excluded data that is not considered to be either recent or applicable (e.g., provide evidence via design or operational change that the data are no longer applicable).</b> CREDIT recovery actions<sup>(see note)</sup> as appropriate; JUSTIFY each such credit (<b>as evidenced such as through procedures or training</b>). Data from the initial year of commercial operation may be excluded; if excluded, JUSTIFY. <b>Note: these recovery actions are those implied in IE-C4(c) or those implied and discussed in IE-C6 through IE-C9.”</b></li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
IE-C4	<ul style="list-style-type: none"> <li>Misplaced, this SR is screening which is performed last for the HLR, therefore, needs to be the last SR in this HLR group.</li> <li>Says "...the event does not involve either an ISLOCA, containment bypass, or reactor pressure vessel rupture." While a SGTR could be considered a 'containment bypass', it would be clearer to identify it explicitly.</li> </ul>	<ul style="list-style-type: none"> <li>ASME</li> <li>ASME</li> </ul>	<ul style="list-style-type: none"> <li>Suggest SGTR be <i>specifically</i> added to this sentence.</li> </ul>
IE-C5	<ul style="list-style-type: none"> <li>It is not clear what is an acceptable justification for deviating from the standard, as such the requirement is too open ended.</li> <li>SR needs to be consistent with IE-C1</li> </ul>	Clarification	<p><u>Cat III</u>: "...JUSTIFY <b><i>excluded data that is not considered to be either recent or applicable (e.g., provide evidence via design or operational change that the data are no longer applicable)</i></b> exclusion of earlier years that are not representative of current data. One acceptable methodology..."</p>
IE-C8	<ul style="list-style-type: none"> <li>Says "CAPTURE...all relevant combinations..." It seems this is more than might be required of a Category II model. It seems both Cat I and Cat II could do some screening based on obviously unimportant (i.e., low probability) combinations relative to other combinations.</li> </ul>	ASME	Suggest that 'all combinations' only has to be done for Cat III.
IE-C9	<ul style="list-style-type: none"> <li>Fault tree modeling of an initiating event is plant-specific by definition (see IE-C6 thru IE-C8) and the treatment of recovery actions needs to be consistent with the requirements in the HRA section of the Standard (HR-F and HR-G).</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I</u>: No requirement to use plant-specific information in the fault-tree modeling. <b><i>"If fault-tree modeling is used, USE plant-specific information in the assessment and quantification of recovery actions where available. See Human Reliability Analysis (para. 4.5.5) for further guidance."</i></b></li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
IE-C12	<ul style="list-style-type: none"> <li>For Cat I and II, there is no minimum list of features and procedures that could significantly influence the ISLOCA frequency</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>Cat I and II: "In the ISLOCA frequency analysis, INCLUDE features of plant and procedures that could significantly influence the ISLOCA frequency: <b>(a) configuration of potential pathways including numbers and types of valves and their relevant failure modes, existence and positioning of relief valves</b> <b>(b) provision of protective interlocks</b> <b>(c) relevant surveillance test procedures"</b></li> </ul>
IE-D2,D3,D4	-----	No objection	-----
IE-D1	<ul style="list-style-type: none"> <li>It is not clear what is an acceptable justification for deviating from the standard, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>"....(a) LIST and JUSTIFY (<b><i>by plant-specific or applicable generic analyses</i></b>) functional categories..."</li> </ul>
<u>4.5.2. - AS</u>			
4.5.2.1	<ul style="list-style-type: none"> <li>Objectives, 1<sup>st</sup> sentence: Says "...reflected in the assessment of CDF and LERF..." However, the Tables and requirements that follow, seem to only address CDF (not LERF).</li> </ul>	ASME	objectives should refer to the LERF section later for specific guidance relative to it, or perhaps the individual tables that follow, when they talk about core damage, should also refer to the LERF section later for specific guidance relative to it.
Table 4.5.2-1	<ul style="list-style-type: none"> <li>HLR-AS-B is inconsistent with the HLR written for Table 4.5.2-2(b). The SRs in Table 4.5.2-2(b) are appropriate for the HLR as written for that table.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><del>HLR-AS-B Dependencies due to initiating events, human interface, functional dependencies, environmental and spatial impacts, and common cause failures shall be addressed.</del> <b>"Dependencies that can impact the ability of the mitigating systems to operate and function shall be addressed."</b></li> </ul>
Tables 4.5.2-2(a) thru 4.5.2-2(c)			
Table 4.5.2-2(b)	-----	No objection	-----
AS-A1,A2,A3 A4,A5,A8, A10,A11	-----	No objection	-----

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
AS-A6	<ul style="list-style-type: none"> <li>As written, with the term “when practical,” there is no minimum, there is no SR for when it is not practical</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“Where practical, sequentially ORDER....in the accident progression. <b><i>Where not practical, provide the bases and provide the rationale used for the ordering.</i></b>”</li> </ul>
AS-A7			
AS-A9	<ul style="list-style-type: none"> <li>This SR appears to be redundant with SRs in SC, effects other than environmental are addressed by the requirements under success criteria</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>Cat I, II and III: “...thermal-hydraulic analyses to determine accident progression parameters (e.g., timing, temperature, pressure, steam) <b><i>the environmental effects (e.g., temperature, pressure, steam) during the accident progression</i></b> that could potentially affect the operability of the mitigating systems.”</li> </ul>
AS-B1,B2,B3 B4B5	-----	No objection	-----
AS-B6	<ul style="list-style-type: none"> <li>As written, there appears to be an implication that the list provided is complete</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“INCLUDE events for which time-phased dependencies might exist. <b><i>Examples are:....</i></b>”</li> </ul>
AS-C2,C3, C4	-----	No objection	-----
AS-C1	<ul style="list-style-type: none"> <li>Says “PROVIDE the basis for the accident sequence process.” The basis is inherent in any method that complies with the other SLRs.</li> </ul>	ASME	Delete “PROVIDE the basis for the accident sequence process.”
<u>4.5.3 - SC</u>			
4.5.3.1	-----	No objection	-----
Table 4.5.3-1	-----	No objection	-----
Tables 4.5.3-2(a) thru 4.5.3-2(c)			
SC-A1,A2,A3 A4,A5,A6	-----	No objection	-----
SC-B2,B3,B4 B5, B6	-----	No objection	-----

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
SC-B1	<ul style="list-style-type: none"> <li>The meaning of “best-estimate” as used in this requirement does not agree with the definition in Section 2; in the SC-B1 context it is redundant with “realistic” and is not needed</li> </ul>	Qualification	<ul style="list-style-type: none"> <li><u>Cat II</u>: “USE appropriate realistic <del>best-estimate</del> generic analyses/evaluations.....requiring detailed computer modeling. Realistic models or analyses may be supplemented...”</li> <li><u>Cat III</u>: “USE <del>best-estimate</del> <b>realistic</b>, plant-specific models....”</li> </ul>
SC-C1,C2, C3, C4	-----	No objection	-----
4.5.4 - SY			
4.5.4.1	-----	No objection	-----
Table 4.5.4-1	-----	No objection	-----
Tables 4.5.4-2(a) thru 4.5.4-2(c)			
SY-A2,A3, A4, A5, A6, A9,A10, A11 A12,A13,A14A15,A16 ,A18 A21,A22	-----	No objection	-----
SY-A1	There is no mention of system models to deal with LERF here nor a reference to the LERF section. Yet, LERF is explicitly mentioned later in places like index no. SY-A5. It is not clear whether this section is meant to cover systems that may need to be modeled only for LERF, or if the LERF section covers those (which probably refers back to the SY part).	ASME	
SY-A7	<ul style="list-style-type: none"> <li>The last sentence, beginning with JUSTIFY is redundant, given the preceding criteria address when limited modeling is acceptable</li> </ul>	ASME	

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
SY-A8	<ul style="list-style-type: none"> <li>Boundaries of a component must match the data.</li> </ul>	Qualification	<ul style="list-style-type: none"> <li>"...MATCH the definitions used to establish the component failure data, or JUSTIFY an alternative assumption. For example, if the pump failure data for the pump include control circuit failures, then the pump boundary must include the control circuitry. ...."</li> </ul>
SY-A15	<ul style="list-style-type: none"> <li>Need clarification on Cat III "To avoid double counting...."</li> </ul>	ASME	
SY-A17	Says "...or SHOW that their exclusion does not to impact the results."	ASME	Delete the word 'to.'
SY-A19	<ul style="list-style-type: none"> <li>If there are not any engineering analyses, there can be no justification for the assumption</li> <li>It seems some of this requirement may have been modeled in the accident sequence modeling rather than in a system model.</li> </ul>	<ul style="list-style-type: none"> <li>Qualification</li> <li>ASME</li> </ul>	<ul style="list-style-type: none"> <li>Cat I and II: "...If engineering analyses are not available, ASSUME that the equipment/system fails with a probability of 1.0. or JUSTIFY the assumed failure probability."</li> <li>Suggest add a statement like what is used at the start of SY-A17 but in this case use - "MODEL explicitly in either the system model or accident sequence modeling, system conditions that cause..."</li> </ul>
SY-A20	<ul style="list-style-type: none"> <li>JUSTIFY appears redundant, criteria given for when credit cannot be taken</li> </ul>	ASME	
SY-A23	<ul style="list-style-type: none"> <li>There are no commonly used analysis methods for recovery in the sense of repair, other than use of actuarial data</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>"...is justified through an adequate recovery analysis or examination of data <b>collected in accordance with DA-C14.</b>" (See DA-C14.)</li> </ul>
SY-B2,B4, B5,B6,B7,B8 B9,B12,B13,B14,B15, B16	-----	No objection	-----
SY-B3	<ul style="list-style-type: none"> <li>JUSTIFY appears redundant, criteria given for selection</li> </ul>	ASME	

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
SY-B1	<ul style="list-style-type: none"> <li>For Cat I, as written, this implies more effort than probably intended by this requirement</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>For Cat I: "MODEL intra-system common-cause failures when supported by generic or plant-specific data (an acceptable model is the screening approach of NUREG/CR-5485, which is consistent with DA-D5), or SHOW that they do not impact the results."</li> </ul>
SY-B6/7	<ul style="list-style-type: none"> <li>These two SRs are related. With the exception of the phrase 'and reflect the variability in conditions present during the postulated accidents etc.' which is standard procedure for PRA analysis, SY-B6 is both immaterial and contradictory to SY-B7</li> </ul>	ASME	<ul style="list-style-type: none"> <li>Rationalize these two SLRs</li> </ul>
SY-B10	<ul style="list-style-type: none"> <li>It is not clear what is an acceptable justification for deviating from the standard, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>"...MODEL them unless a justification is provided (<i>i.e., that is unique to the system and highly reliable</i>). ...."</li> </ul>
SY-B11	<ul style="list-style-type: none"> <li>It is not clear what is an acceptable justification for deviating from the standard, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>"COMPARE <b>MODEL the limitation of</b> the available inventories of air, power, and cooling with those required respect to supporting the mission time. <b>TREAT these inventories in the model unless a justification is provided.</b>"</li> </ul>
SY-C1,C2 C3	-----	No objection	-----
<b>4.5.5 - HR</b>			
4.5.5.1	-----	No objection	-----
Table 4.5.5-1	-----	No objection	-----
Tables 4.5.5-2(a) thru 4.5.5-2(i)			
HR-A1,A2, A3	-----	No objection	-----
HR-B1,B2	-----	No objection	-----
HR-C1,C2	-----	No objection	-----

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
HR-C3	common cause or common dependency effects are included as part of the miscalibration impact.	ASME	suggest strengthening this statement to make sure any common cause or common dependency effects are included as part of the miscalibration impact.
HR-D1,D2, D3, D4,D5, D6,D7	-----	No objection	-----
HR-E2, E3, E4	-----	No objection	-----
HR-E1	item (a): Seems this should include specific example mention of SAMGs and/or reference LERF sections later to cover the key human response actions that are 'post-damage.'	ASME	
HR-F1,F2	-----	No objection	-----
HR-G1,G2, G3, G5,G6, G7, G9	-----	No objection	-----
HR-G4	For Cat II, plant-specific thermal-hydraulic analysis is required which seems inconsistent with SC-B1 that allows realistic but "similar plant" T-H for Cat II.	Clarification	<ul style="list-style-type: none"> <li>• <b>Cat II: "BASE the time available to complete actions on appropriate, realistic generic thermal-hydraulic analyses, or simulations from similar plants (e.g., plant of similar design and operation). SPECIFY the point in time at which operators are expected to receive relevant indications.</b></li> <li>• <b>Cat III: "BASE the time available to complete actions on plant-specific thermal-hydraulic analyses, or simulations SPECIFY the point in time at which operators are expected to receive relevant indications.</b></li> </ul>
HR-G8	<ul style="list-style-type: none"> <li>• It is not clear what is an acceptable justification, as such the requirement is too open ended.</li> </ul>	Qualification	<ul style="list-style-type: none"> <li>• "DEFINE and JUSTIFY (<i>provide evidence that there are not any dependencies, e.g., shaping factors, management, among the human failure events such that cutsets were inappropriately truncated</i>) the minimum probability...."</li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
HR-H1	<ul style="list-style-type: none"> <li>To be consistent with HR-H2 and HR-H3, this SR needs to make it clear that recovery does not include repair, which is dealt with actuarially, not by modeling via human reliability analysis</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I and II</u>: "INCLUDE...the dominant sequences. <b><i>Recovery actions are limited to those to which HRA techniques can be applied, such as system reconfiguration, or simple actions such as manually opening or closing a failed valve, but not repair.</i></b>"</li> <li><u>Cat III</u>: "INCLUDE....components. <b><i>Recovery actions are limited to those to which HRA techniques can be applied, such as system reconfiguration, or simple actions such as manually opening or closing a failed valve, but not repair.</i></b>"</li> </ul>
HR-H2	<ul style="list-style-type: none"> <li>The criteria provided for crediting recovery actions is incomplete; there are other factors equally important that need to be addressed before credit can be allowed</li> <li>As written, there is no requirement to justify multiple recovery actions which can result in inaccurate and misleading results</li> </ul>	Qualification	<ul style="list-style-type: none"> <li>"...skill of the craft exist <b><i>(c) attention is given to the relevant performance shaping factors provided in HR-G3</i></b> <b><i>(d) there is sufficient manpower to perform the action. If credit is taken for multiple operator recovery actions ENSURE that it has been determined that the appropriate manpower is available, taking into account such things as the fluctuating manpower with time of the day.</i></b>"</li> </ul>
HR-I1	-----	No objection	-----
<u>4.5.6 - DA</u>			
4.5.6.1	Objectives, item (a): Says "...appropriately reflect that configuration..."	ASME	Change 'that' to 'the'.
Table 4.5.6-1	-----	No objection	-----
Tables 4.5.6-2(a) thru 4.5.6-2(e)			
DA-A1,A2,A3	-----	No objection	-----
DA-B1,B2	-----	No objection	-----

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
DA-C2,C3, C4,C5,C6, C7, C8,C9 C10,C11, C12,C13, C15	-----	No objection	-----
DA-C1	There is a reference to DA-A13; I think this should be DA-A.	ASME	
DA-C14	<ul style="list-style-type: none"> <li>This SR, which provides a justification for crediting equipment repair, assumes plant-specific data will be sufficient to justify this credit. For such components as pump repair, plant-specific data is insufficient and a broader base is needed</li> </ul>	Qualification	<ul style="list-style-type: none"> <li>"IDENTIFY instances of plant-specific component repair from <b><i>both plant-specific and industry experience</i></b> and for each repair, COLLECT...."</li> </ul>
DA-D2,D4, D6, D7	-----	No objection	-----
DA-D1	<ul style="list-style-type: none"> <li>For Cat I, as written, requirements are not practical in that difficult if not impossible to meet, if the feature is unique, there may be little to no plant-specific data</li> <li>For Cat II and III, as written, requirements appear to be inconsistent with Table 1.3-1 and IE-C2</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><b>Cat I:</b> "USE plant-specific parameter estimates <b><i>for events modeling</i></b> the unique design or operational features <b><i>if available, or use generic information modified as discussed in DA-D2; USE</i></b> with generic information for the remaining events."</li> <li><b>Cat II:</b> "CALCULATE realistic parameter estimates for dominant contributors; <b><i>if sufficient plant-specific data is not available</i></b>, use a Bayesian update <b><i>process of generic industry data</i></b>. CHOOSE prior distributions as either non-informative, or representative of variability in industry data. CALCULATE parameter estimates for the remaining events <b><i>by using generic industry data.</i></b>"</li> <li><b>Cat III:</b> "<b><i>CALCULATE realistic parameter estimates; if sufficient plant-specific data is not available, use a Bayesian update process of generic industry data. CHOOSE prior distributions as either non-informative, or representative of variability in industry data.</i></b>"</li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
DA-D3	<ul style="list-style-type: none"> <li>For Cat II, a mean value is required for CDF and LERF; assigning mean values only to events that “contribute measurably” can result in combining events where some have mean values and some are point estimates, which does not result in a mean CDF or LERF.</li> <li>Cat II and III, as written, a mean value of the uncertainty intervals is required, which is incorrect (caused by incorrect comma after ‘representation of’)</li> </ul>	Qualification	<ul style="list-style-type: none"> <li><u>Cat II</u>: “PROVIDE a mean value of, and a statistical representation of the uncertainty intervals for, the parameter estimates that contribute measurably to CDF and LERF. <b><i>The parameter estimates that contribute measurably are those events that are retained in the sequences that survive truncation in the final quantification of CDF and LERF.</i></b> Acceptable systematic methods include Bayesian updating, frequentist method, or expert judgment.”</li> <li><u>Cat III</u>: “PROVIDE a mean value of, and a statistical representation of the uncertainty intervals for, the parameter estimates. Acceptable systematic methods include Bayesian updating, frequentist method, or expert judgment.”</li> </ul>
DA-D5	<ul style="list-style-type: none"> <li>Cat I, does not appear to be consistent with SY-B1</li> <li>Cat II and III: the SR already provides the generally used and known approaches, therefore, it is not clear what is an acceptable justification for an alternative, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I</u>: “USE the Beta-factor approach (<b><i>i.e., the screening approach in NUREG/CR-5485</i></b>) or an equivalent for the estimation of CCF parameters.”</li> <li><u>Cat II and III</u>: “...JUSTIFY the use of alternative methods (<b><i>i.e., provide evidence of peer review or QA of the method which demonstrates its acceptability</i></b>).</li> </ul>
DA-E1	-----	No objection	-----
<u>4.5.7 - IF</u>			
4.5.7.1	-----	No objection	-----
Table 4.5.7-1	-----	No objection	-----
Tables 4.5.7-2(a) thru 4.5.7-2(f)			
IF-A1,A2,A3 A4	-----	No objection	-----
IF-B1,B2,B3 B4	-----	No objection	-----
IF-C1,C3 C4, C6	-----	No objection	-----

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
IF-C2	<ul style="list-style-type: none"> <li>It is not clear what is an acceptable justification for deviating from the standard, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“...JUSTIFY any credit given, particularly any credit given for <b><i>INCLUDE credit only when there are available non-flood proof doors or barriers, and credit procedures or skill of the craft exist for isolation of a flood source including the method of detection (i.e., operator detection via control room indication or alarms)</i></b>, accessibility to the isolation device, and time available to perform the action.</li> </ul>
IF-C5	<ul style="list-style-type: none"> <li>Cat II and III: the SR already provides criteria, therefore, it is not clear what is an acceptable justification for an alternative, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“...JUSTIFY any other qualitative screening criteria (<b><i>provide evidence that the qualitative alternative used is acceptable.</i></b>)”</li> </ul>
IF-D1,D2,D3 D4, D5	-----	No objection	-----
IF-E1,E2,E3 E4, E6,E7	-----	No objection	-----
IF-E5	<ul style="list-style-type: none"> <li>Use of JUSTIFY too open ended particularly considering these are extraordinary recovery actions that are not proceduralized</li> </ul>	Qualification	<ul style="list-style-type: none"> <li>“...JUSTIFY the use of extraordinary recovery actions that are not proceduralized (<b><i>provide evidence of appropriate training that would ensure knowledge, skill of the craft.</i></b>)”</li> </ul>
IF-F1,F2	-----	No objection	-----
<b>4.5.8 - QU</b>			
4.5.8.1	-----	No objection	-----
Table 4.5.8-1	HLR-QU-A and Table 4.5.8-2(a) objective statement just before table: These objective statements do not exactly agree.	ASME	
Tables 4.5.8-2(a) thru 4.5.8-2(f)			
QU-A1,A3 A4	-----	No objection	-----

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
QU-A2	<ul style="list-style-type: none"> <li>The SR is incomplete, and as written, a point estimate may be quantified for CDF and LERF for Cat II and III</li> </ul>	Qualification	<ul style="list-style-type: none"> <li><b>Cat I:</b> "ESTIMATE the overall <i>point estimate</i> from internal events. <b>QUANTIFY PROVIDE estimates of the</b> individual sequences <i>in a manner consistent with the estimation of total CDF</i> to identify dominant sequences....is appropriately reflected. The estimates may be accomplished by using....split fractions."</li> <li><b>Cat II:</b> "ESTIMATE the overall <i>mean CDF</i> from internal events, <i>ensuring that the "state-of-knowledge" correlation between event probabilities is taken into account.</i> <b>QUANTIFY PROVIDE estimates of the</b> individual sequences <i>in a manner consistent with the estimation of total CDF</i> to identify dominant sequences....is appropriately reflected. The estimates may be accomplished by using....split fractions."</li> <li><b>Cat III:</b> ESTIMATE <b>CALCULATE</b> the overall <i>mean CDF</i> from internal events <i>by propagating the uncertainty distributions, ensuring that the "state-of-knowledge" correlation between event probabilities is taken into account.</i> <b>QUANTIFY PROVIDE estimates of the</b> individual sequences <i>in a manner consistent with the estimation of total CDF</i> to identify dominant sequences....is appropriately reflected. The estimates may be accomplished by using....split fractions."</li> </ul>
QU-B1, B3, B4, B5, B6, B7, B8, B9,	-----	No objection	-----
QU-B2	Requirement not needed, appropriately addressed by QU-B3	ASME	
QU-C2,C3	-----	No objection	-----

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
QU-C1	<ul style="list-style-type: none"> <li>Screening values as used in the Human Reliability Analysis section are values that, if shown not to contribute may be retained in the model as is. QU-C1 is to perform an analysis using artificially high values for HEPs to identify those cutsets that contain multiple HFES and need to be reviewed for dependency</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“IDENTIFY cutsets with multiple HFES <b>by requantifying the PRA model with HEP values set to values that are sufficiently high that the cutsets are not truncated.</b> The final quantification of these post-initiator HFES may be done at the cutset level or saved sequence level.”</li> </ul>
QU-D1,D2 D3, D4, D5	-----	No objection	-----
QU-D3	<ul style="list-style-type: none"> <li>what is meant by Comment on the difference between “unique outliers” in Cat II and “significant differences” in Cat III.</li> <li>what is meant by confirm versus review (to review to ?)</li> </ul>	ASME	
QU-D5	<ul style="list-style-type: none"> <li>examine for what purpose (open-ended)?</li> </ul>	ASME	<ul style="list-style-type: none"> <li>When evaluating the importance of SSCs account for the contribution to IE frequencies when applicable</li> </ul>
QU-E1,E2 E4	-----	No objection	-----
QU-E3	<ul style="list-style-type: none"> <li>For Cat II, the uncertainty intervals associated with parameter uncertainties need to be estimated taking into account the “state of knowledge” correlations</li> </ul>	Qualification	<ul style="list-style-type: none"> <li>Cat II: “ESTIMATE the uncertainty interval of the overall CDF results. ESTIMATE the uncertainty intervals associated with parameter uncertainties <b>taking into account the “state-of-knowledge” correlation.</b>”</li> </ul>
QU-F1, F2, F4, F5, F6	-----	No objection	-----
QU-F3	<ul style="list-style-type: none"> <li>Important assumptions and causes of uncertainty can significantly effect the decision-making when using results from any category and QU-F3 is inconsistent with QU-F1(I) for categories I and II.</li> </ul>	Qualification	<ul style="list-style-type: none"> <li>Cat I and II: “<b>DOCUMENT important assumptions and causes of uncertainty, such as: possible optimistic or conservative success criteria, ... possible spatial dependencies, etc.</b>” No requirement to document important assumptions and causes of uncertainty.</li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
QU-F6		ASME	
<u>4.5.9 - LE</u>			
4.5.9.1	-----	No objection	-----
Table 4.5.9-1	HLR-LE-A and Table 4.5.9-2(a), statement just before table (in two places): These statements do not exactly agree.	ASME	
Tables 4.5.9-2(a) thru 4.5.9-2(g)			
LE-A1,A2, A3, A4, A5	-----	No objection	-----
LE-B3	-----	No objection	-----
LE-B1	<ul style="list-style-type: none"> <li>references here to Table 4.5.9-2(a) -- I think this should be Table 4.5.9.3.</li> </ul>	ASME	
LE-B2	<ul style="list-style-type: none"> <li>The modifiers (e.g., may, possible) in Cat I, II and III appear to eliminate the distinction between Category I, II and III, and does not provide a minimum in Cat I or II</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I</u>: "...An acceptable alternative is the approach in NUREG/CR-6595 [Note (1)]." <del>Realistics loads may be used when available.</del></li> <li><u>Cat II</u>: USE containment loads....that are realistic-when possible for significant challenges to containment. Conservative treatment may be <del>is</del> used for non-dominant LERF contributors.</li> <li><u>Cat III</u>: USE containment loads....that are realistic-when possible for significant challenges to containment.</li> </ul>
LE-C1,C5 C6, C7	-----	No objection	-----
LE-C2	<ul style="list-style-type: none"> <li>It is not clear what is an acceptable justification, as such the requirement is too open ended.</li> <li>Credit of equipment repair needs to be consistent with the Level 1 requirements</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat II and III</u>: "...Repair of equipment may be considered if <b><i>it can be established that the plant conditions do not preclude repair and actuarial data exists from which to estimate the repair failure probability.</i></b>" appropriate justified</li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
LE-C3	<ul style="list-style-type: none"> <li>It is not clear what is an acceptable justification, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat II and III</u>: "...PROVIDE technical justification (<b><i>by plant-specific or applicable generic calculations demonstrating the feasibility of the actions, scrubbing mechanisms, or beneficial failures</i></b>) ..."</li> </ul>
LE-C4	<ul style="list-style-type: none"> <li>The modifiers (e.g., may, possible) in Cat I, II and III appear to eliminate the distinction between Category I, II and III, and does not provide a minimum in Cat I or II</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I</u>: "USE conservative system success criteria." <del>Realistic criteria may be used:</del></li> <li><u>Cat II</u>: "...Conservative system success criteria <del>may be</del> <b><i>is</i></b> used for non-dominant LERF contributors."</li> </ul>
LE-C8	<ul style="list-style-type: none"> <li>The modifiers (e.g., may, possible) in Cat I, II and III appear to eliminate the distinction between Category I, II and III, and does not provide a minimum in Cat I or II</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I</u>: "...An acceptable alternative is the approach in NUREG/CR-6595 [Note (1)]." <del>A realistic treatment may be used:</del></li> <li><u>Cat II</u>: "...in a realistic manner <del>when possible</del>. Conservative treatment <del>may be</del> <b><i>is</i></b> used for non-dominant LERF contributors.</li> <li><u>Cat III</u>: "TREAT .... in a realistic manner" <del>when possible</del>.</li> </ul>
LE-C9	<ul style="list-style-type: none"> <li>The modifiers (e.g., may, possible) in Cat I, II and III appear to eliminate the distinction between Category I, II and III, and does not provide a minimum in Cat I or II</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I</u>: "...An acceptable alternative is the approach in NUREG/CR-6595 [Note (1)]." <del>A realistic treatment may be used:</del></li> <li><u>Cat II</u>: "...in a realistic manner <del>when possible</del>. Conservative treatment <del>may be</del> <b><i>is</i></b> used for non-dominant LERF contributors.</li> <li><u>Cat III</u>: "TREAT .... in a realistic manner" <del>when possible</del>.</li> </ul>
LE-C10	<ul style="list-style-type: none"> <li>Modifiers in Cat I appears to eliminate the distinction between Cat I and II, and therefore, there is not a minimum in Cat I</li> <li>It is not clear what is an acceptable justification, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I</u>: "...An acceptable alternative is the approach in NUREG/CR-6595 [Note (1)]." <del>Realistic treatment may be used:</del></li> <li><u>Cat II and III</u>: "...JUSTIFY any credit taken for reducing the class of the release by scrubbing (<b><i>i.e., provide the source of the decontamination factor used</i></b>)."</li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
LE-D1	<ul style="list-style-type: none"> <li>It is not clear what is an acceptable justification, as such the requirement is too open ended.</li> <li>In the Cat III column, it seems the words "...by using plant-specific input." should be in <b>bold</b> after the verb PERFORM.</li> <li>The 'may' term in Cat I and II appears to eliminate the distinction between Cat I and II, and does not provide a minimum in Cat I or II</li> </ul>	<ul style="list-style-type: none"> <li>Clarification</li> <li>ASME</li> </ul>	<ul style="list-style-type: none"> <li><u>Cat I</u>: "...USE a conservative evaluation of containment capacity for dominant containment failure modes. <del>A realistic evaluation may be used.....</del> EVALUATE impact of ..... vent pipe bellows, <b>and INCLUDE in as potential</b> failure modes, as required..... Such considerations <del>may</del> need to be included for small volume containments...."</li> <li><u>Cat II</u>: "...PERFORM a realistic containment capacity analysis for dominant containment failure modes. <del>The analysis may include some conservative parameters</del> <b>USE a conservative evaluation of containment capacity for non-dominant containment failure modes.</b> EVALUATE impact of ..... vent pipe bellows, <b>and INCLUDE in as potential</b> failure modes, as required.... JUSTIFY applicability to the plant being evaluated. <b>Analyses may consider use of similar containment designs or estimating containment capacity based on design pressure and a realistic multiplier relating containment design pressure and median ultimate failure pressure.</b> Quasi-static containment capability evaluations .... Such considerations <del>may</del> need to be included for small volume containments...."</li> </ul>
LE-D2	<ul style="list-style-type: none"> <li>It is not clear what is an acceptable justification, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I</u>: "...JUSTIFY applicability of generic and other analyses. <b>Analyses may consider conservative comparison with similar failure locations in similar containment designs.</b> An acceptable alternative...."</li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
LE-D3	<ul style="list-style-type: none"> <li>• Stating a ‘realistic evaluation is acceptable’ in Cat I appears to eliminate the distinction between category I and II, and does not provide a minimum in Cat I</li> <li>• It is not clear what is an acceptable justification, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>• <u>Cat I</u>: “USE a conservative evaluation of interfacing system failure probability for <del>dominant</del> failure modes. <del>A realistic evaluation is acceptable.</del> IF generic analyses generated for similar plants are used, JUSTIFY applicability to the plant being evaluated. <b>Analyses may consider conservative comparison with similar interfacing systems in similar containment designs.</b>”</li> <li>• <u>Cat II</u>: “PERFORM a <b>realistic</b> interfacing system failure probability analysis. Evaluation .... may include conservatisms. <b>USE a conservative evaluation of interfacing system failure probability for non-dominant failure modes.....</b> JUSTIFY applicability to the plant being evaluated. <b>Analyses may consider realistic comparison with similar interfacing systems in similar containment designs</b></li> <li>• <u>Cat III</u>: “PERFORM a realistic interfacing system failure probability analysis for <del>dominant</del> the failure modes.....</li> </ul>
LE-D4	<ul style="list-style-type: none"> <li>• The ‘may’ term in Cat I appears to eliminate the distinction between category I and II, and does not provide a minimum in Cat I</li> <li>• It is not clear what is an acceptable justification, as such the requirement is too open ended.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>• <u>Cat I</u>: “USE a conservative evaluation of secondary side isolation capability for <del>dominant</del> SG tube failure modes. <del>A realistic evaluation may be used.</del> IF generic analyses generated for similar plants are used, JUSTIFY applicability to the plant being evaluated. <b>Analyses may consider conservative comparison with similar isolation capability in similar containment designs.</b>”</li> <li>• <u>Cat II</u>: “PERFORM a <b>realistic</b> secondary side isolation capability analysis for dominant SG tube failure modes. Evaluation .... may include conservatisms. <b>USE a conservative evaluation of secondary side isolation capability for non-dominant SG tube failure modes.....</b> JUSTIFY applicability to the plant being evaluated. <b>Analyses may consider realistic comparison with similar isolation capability in similar containment designs</b>”</li> <li>• <u>Cat III</u>: “PERFORM a realistic secondary side isolation capability analysis for <del>dominant</del> SG tube failure modes...”</li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
LE-D5	<ul style="list-style-type: none"> <li>The modifiers (e.g., may, possible) in Cat I, II and III appear to eliminate the distinction between Category I, II and III, and does not provide a minimum in Cat I or II</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I</u>: "TREAT induced SG tube rupture in a conservative manner." <del>A realistic treatment may be used.</del></li> <li><u>Cat II</u>: "TREAT induced SG tube rupture in a realistic manner, when practical. <del>Conservative treatment may be used, when justified.</del>"</li> </ul>
LE-D6	<ul style="list-style-type: none"> <li>The 'may' term in Cat I appears to eliminate the distinction between category I and II, and does not provide a minimum in Cat I</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I</u>: "TREAT containment isolation in a conservative manner." <del>A realistic treatment may be used.</del></li> <li><u>Cat II</u>: "TREAT containment isolation in a realistic manner <b>for dominant contributors</b>. Conservative treatment <b>is</b> <del>may be</del> used for non-dominant contributors.</li> </ul>
LE-E1,E3	-----	No objection	-----
LE-E2	<ul style="list-style-type: none"> <li>Modifiers in Cat II appears to eliminate the distinction between Cat II and III, and therefore, there is not a minimum in Cat II</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat II</u>: "USE realistic parameter estimates <del>when possible</del> for dominant LERF sequences. <b>Conservative parameter estimates are used for non-dominant LERF sequences.</b>"</li> <li><u>Cat III</u>: "USE realistic parameter estimates <del>when possible.</del>"</li> </ul>
LE-F1	<ul style="list-style-type: none"> <li>Inconsistent with QU-D5</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat I</u>: "LIST the dominant contributors to LERF....REVIEW for reasonableness."</li> <li><u>Cat II and III</u>: PERFORM an importance analysis .... to LERF."</li> </ul>
LE-F2	<ul style="list-style-type: none"> <li>Inconsistent with QU-E</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>Cat III</u>: "<b>PROVIDE uncertainty analysis which identifies the key sources of uncertainty and includes sensitivity studies.</b>"</li> </ul>
LE-G1,G2, G3, G4, G5, G6,G7, G8	-----	No objection	-----
Table 4.5.9-3	-----	No objection	-----
<b>Chapter 5</b>			
5.1 thru 5.3	-----	No objection	-----

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
5.4	<ul style="list-style-type: none"> <li>As a PRA is maintained, it may go through such changes that the results are significantly impacted ( e.g., very different contributors, order magnitude change in CDF).</li> <li>A new PRA method, for example, needs to be at least the HLRs.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>3<sup>rd</sup> para: “Changes to a PRA due to PRA maintenance <b>and PRA upgrade (where applicable)</b> shall meet the requirements of Section 4. <b>Prior to an application, if the changes have significantly impacted the PRA results, the maintained PRA shall receive a peer review and which satisfy the peer review requirements specified in Section 6, but limited to aspects of the PRA that have been maintained.</b> Upgrades of a PRA <b>shall receive a peer review and</b> shall satisfy the peer review requirements specified in Section 6, but limited to aspects of the PRA that have been upgraded.”</li> </ul>
5.5	<ul style="list-style-type: none"> <li>The use of the word “should” does not provide a minimum requirement</li> </ul>	ASME	<ul style="list-style-type: none"> <li>“...These changes shall be addressed in a fashion...”</li> </ul>
5.6	out of scope	ASME	
5.7	-----	No objection	-----
5.8 (a)-(d), (f)-(g)	-----	No objection	-----
5.8 (e)	<ul style="list-style-type: none"> <li>It is unclear what needs to be documented from the peer review</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“(e) record of the performance and results of the appropriated PRA reviews (<b>consistent with the requirements of Section 6.6</b>)”</li> </ul>
<b>Chapter 6</b>			
6.1	<ul style="list-style-type: none"> <li>The purpose of the peer review, as written, implies that it is solely an audit against the requirements of Section 4. A key objective of the peer review is to ensure when evaluating the PRA against the requirements in Section 4 is to determine the “quality” (i.e., strengths and weaknesses) of the PRA; this goal needs to be clearly understood by the peer review team</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“...The peer review shall assess the PRA to the extent necessary to determine if the methodology and its implementation meet the requirements of this Standard <b>to determine the strengths and weaknesses in the PRA. Therefore, the peer review shall also assess the appropriateness of the significant assumptions.</b> The peer review need not assess...”</li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
6.1.1	<ul style="list-style-type: none"> <li>• see issue discussed on 5.4</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>• “...When peer reviews are conducted on <b><i>PRA maintenance</i></b> or PRA upgrades, the latest review shall be considered the review of record....”</li> </ul>
6.1.2	<ul style="list-style-type: none"> <li>• see issue discussed on 5.4</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>• <u>3<sup>rd</sup> para</u>: “NEI-00-02 provides an example of an acceptable review methodology (<b><i>subject to clarifications and qualifications described in Appendix B of this regulatory guide</i></b>); however, the differences....”</li> </ul>
6.2			
6.2.1	-----	No objection	-----
6.2.2	<ul style="list-style-type: none"> <li>• as written, in Section 6.2.2.2, it appears that the constraints on the team members only apply when the review is performed for a PRA upgrade</li> <li>• see issue discussed on 5.4</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>• “6.2.2.1 The peer review team members individually shall (a) be knowledgeable....(b) be experienced ....for which the reviewer is assigned. <b><i>The peer review team members shall (a) not be allowed to review their own work or work for which they have contributed, (b) not be allowed to review a PRA for which they have a conflict of interest, such as a financial or career path incentive or disincentive that may influence the outcome of the peer review.</i></b> 6.2.2.2 When a peer review is being performed on a PRA maintenance or a PRA upgrade, reviewers shall have knowledge and experience appropriate for the specific PRA Elements being reviewed. However, the other requirements of this Sections shall also apply.” The peer review team members shall (a) not be allowed to review their own work or work for which they have contributed, (b) not be allowed to review a PRA for which they have a conflict of interest, such as a financial or career path incentive or disincentive that may influence the outcome of the peer review:</li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
6.2.3	<ul style="list-style-type: none"> <li>see issue discussed on 5.4</li> <li>As written, it appears that the last paragraph could allow a team to be composed of a single member</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>5<sup>th</sup> para</u>: "...such as a review of a <b><i>maintenance or</i></b> upgrade of a PRA element,..."</li> <li><u>6<sup>th</sup> para</u>: "Exceptions to the requirements of this paragraph may be taken based on the availability of appropriate personnel to develop a team (<b><i>where a team is a group of several individuals</i></b>). All such exceptions shall be documented in accordance with para. 6.6 of this Standard."</li> </ul>
6.3	<ul style="list-style-type: none"> <li>As written, there does not appear to be a minimum set, the requirement as written provide "suggestions." A minimal set of items needs to be provided; the peer reviewers have flexibility in deciding on the scope and level of detail for each of the minimal items.</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><u>1<sup>st</sup> para</u>: "The peer review team shall use the requirements.... of this Standard. <b><i>For each PRA element, a set of review topics required for the peer review team are provided in the subparagraphs of para. 6.3.</i></b> Some subparagraphs of para. 6.3 contain specific suggestions for the review team to consider during the review. Additional material for those Elements may be reviewed depending on the results obtained. The judgment of the reviewer shall be used to determined the specific scope and depth of each review topic for each PRA element."</li> </ul>
6.3.1	-----	No objection	-----
6.3.2	-----	No objection	-----
6.3.3 (a), (c)-(j)	-----	No objection	-----
6.3.3 (b)		ASME	Remove "modeling of"
6.3.4	-----	No objection	-----
6.3.5	<ul style="list-style-type: none"> <li>The requirement, as written, is only fro the reviewers to look at the HEPs and does not include the HFES. Identification of the HFES is a major part of the HRA, as indicated in Section 4.5.5.</li> </ul>	Qualification	<ul style="list-style-type: none"> <li><b><i>"(i) the selection and identification of the HFES associated with the HEPs for the above review topics."</i></b></li> </ul>

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
6.3.5	HEP misused (e.g., post-accident HEP inaccurate, it is HEP of a post-accident HFE)	ASME	
6.3.6 (a)	<ul style="list-style-type: none"> <li>As written, it does not appear that review of the data values would include its defined boundary for the component which is an essential aspect of the review</li> <li>It is not clear that “contributing” would include components, if degraded would have a significant impact</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“(a) data values <b>and the defined component boundary</b> for component failure modes contributing to the CDF or LERF (<b>including active components with high RAW values</b>) calculated in the PRA”</li> </ul>
6.3.6 (b)-(d)	-----	No objection	-----
6.3.7	-----	No objection	-----
6.3.8	<ul style="list-style-type: none"> <li>The purpose of the review to include review the interpretation of results.</li> <li>review of codes, no requirements to review against</li> </ul>	ASME	
6.3.9	-----	No objection	-----
6.4	-----	No objection	-----
6.5	<ul style="list-style-type: none"> <li>see issue discussed on 5.4</li> </ul>	Clarification	<ul style="list-style-type: none"> <li>“The peer review team shall review the process, including implementation, for <b><i>maintaining or</i></b> upgrading the PRA against the configuration control requirements of this Standard.”</li> </ul>
6.6			

<u>Index No</u>	<u>Issue</u>	<u>Regulatory Position</u>	<u>Resolution</u>
6.6.1	<ul style="list-style-type: none"> <li>It is not clear, as written, if certain essential items are included in the documentation requirements that are needed to accomplish the goal of the peer review</li> </ul>	Clarification	<ul style="list-style-type: none"> <li><b><i>“(j) identification of the strengths and weaknesses that have a significant impact on the PRA                      (k) assessment (e.g., significance) of the assumptions playing a key role in the PRA results                      (l) confirmation of the capability categories noted in the PRA for each SR from Section 4.5 of the Standard.”</i></b></li> </ul>
6.6.2	-----	No objection	-----