NRC Comments on LPSD Standard

Index No.	Issue	Position	Resolution
Foreword	The standard states that the qualitative risk assessment (QLRA) requirements are specifically intended for models which support NRC regulation 10CFR50.65(a)(4) during shutdown – a standard should not prescribe a specific regulatory compliance issue and application, especially one in which the NRC has not stated its concurrence as to the purpose of the QLRA portion of the standard.	Qualification	"The shutdown QLRA requirements in this standard are for models for use in support of configuration risk assessments ~~as required by the NRC's regulation 10CFR50.65(a)(4)~~ while in a shutdown condition."
1.1 2nd paragraph	Same issue with identifying conformance to standard as satisfying specific NRC regulations.	Qualification	"Also described in this Standard, QLRAs are used to support shutdown configuration risk management (CRM)~~, in accordance with 10CFR50.65(a)(4)~~."
1.1 6th and 7th paragraphs	The staff has no position on the QLRA requirements in this document. However, there are references to NUMARC 93-01, NUMARC 91-06 and NEI 06-09 (guidance for risk informed technical specifications (RITS) 4B in mode 2) which seem to be used as a basis for only applying the QLRA in modes 3 – 6 (pressurized water reactors (PWRs)) and equivalent modes for boiling water reactors BWRs. This is not logically coherent.	Qualification	Delete reference to these documents, and establish alternate basis for scope of QLRA.
1.1 9th paragraph, 1st bullet	Same issue with identifying conformance to standard as satisfying specific NRC regulations.	Qualification	"In so doing, the process set forth in this standard will provide confidence in the continuing role of shutdown QLRA methods in protecting the health and safety of the public ~~and complying with 10CFR50.65(a)(4)~~."

Enclosure

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1.2.1 4th paragraph	The reference to the "economics" of normal plant operation is not the focus of any PRA or standard, it is the continued "at power" operation of the reactor and turbine-generator.	Clarification	"The normal plant operations that are being challenged **during shutdown** are key safety functions – e.g., reactivity control, reactor pressure control, reactor coolant inventory control, decay heat removal, etc – and not the ~~economics~~ **capability for continued** ~~of~~ normal plant operation."
Section 1.2.2.2 Plant Operational States	For shutdown QLRAs, a POS is not just used to establish the plant conditions that impact system availability supporting the key safety functions but the operator's ability to use the systems during the POS.	Qualification	"a POS is used to establish the plant conditions that impact system availability **and the operator's ability to use those systems** which support the key safety functions"
Section 1.2.2.3	The first sentence states that "Risk is generally defined as "frequency multiplied by consequence" for a set of accident sequences". This is not a definition but rather one measure of risk. It is more common to see risk defined as the set of triplets: what can go wrong, how likely is it, and what are the consequences.	Clarification	"Risk is ~~generally defined~~ **often represented** as …" Or Risk is commonly represented …
Section 1.2.2.3	It is not clear why the CDF is equated to a **conditional** probability of core damage. A frequency has dimension of inverse time whereas a probability is dimensionless. What is being calculated is the expected number of events. The resolution provided is not ideal – it would be better to correct this throughout.	Qualification	"However, risk is commonly represented by surrogate risk metrics based on the frequency of a particular consequence occurring. For quantitative risk assessments, frequently used risk metrics include the frequency of core damage (CDF) and the frequency of a large, early release of radioactivity (large early release frequency (LERF)). These risk metrics are expressed as "frequencies," but ~~can be thought of as~~ **because the frequencies are small will, for this discussion, can be equated mathematically to** the ~~conditional~~ probability of the

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	The discussion of the calculation of CDF is confusing. The evaluation of the CDF for the at-power POS addressed in Section 2 of the combined standard incorporates the time spent in that POS. ANS 58.22 calculates an annualized CDF for each POS based on the assumption that the POS exists for a complete calendar year. To avoid confusion, this needs to be referred to as a Conditional CDF or CCDF. However, the risk from some POSs is to a first order approximation independent of duration. For example the risk associated with drain down is dependent on how often draindown occurs, not how long it takes. An alternative to the resolution provided is to change the requirements so that the initiating event (IE) frequencies incorporate the duration factor explicitly. The units of equipment and human failure rates are only relevant if they are the initial failures leading to an initiating event. Otherwise they are converted into probabilities of basic events.		specified consequence occurring during a specified time duration. Thus, core damage frequency, CDF, is the ~~conditional~~ probability of core damage occurring during a specified time duration, usually a year. In assessing risk from full-power operation, analysts define a year variously to mean a "calendar year" (i.e., an average year with respect to the plant availability) or a "reactor operating year" (i.e., a year assuming the plant is operating at full power for the entire time). This Standard requires the calculation of initiating event frequencies on a per calendar year basis (see Table 4.5.1-4). For full-power probabilistic risk assessments (PRAs), this distinction (between calendar year and reactor year) is not always made since the plant is typically operating for a large fraction of a year. However, for conformance with supporting requirement IE-C3 in the ASME/ANS RA-S-2008 the plant availability factor must be included. **The resulting CDF is an unconditional CDF for a calendar year, in the sense that it can be added to the unconditional CDF for each of the other POSs to obtain the total CDF from the plant**. This section discusses the use of risk metrics to represent risk specifically when multiple POSs are involved, as is the case with LPSD POSs. It is important to clearly distinguish the units of risk metrics since POSs can be short (thus, a "calendar year" and a "POS year" (*provide a definition of POS year as "one year with the plant in the configuration of the POS") will be quite different) and the summation of risk metrics from several POSs is appropriate only for specific calculations of risk metrics. The implications will be illustrated using CDF as the example risk metric; however, the concepts apply equally to LERF or any other risk metric which is a conditional probability. This standard presents requirements

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			for calculating the **conditional CDF, C**CDF, of each POS. This **C**CDF is usually expressed as the core damage frequency per year conditional on the occurrence of the POS. It is based on **initiating event** frequenc**ies** ~~y data for initiating events, and equipment and human failure rates~~ that are stated per year. However, the duration (the "exposure period") of any given POS is usually much shorter than one year. This "exposure period" must be considered in determining the actual risk produced by any individual POS for different outage types and in aggregating the risk produced by multiple POSs. The risk actually produced by a POS is represented by the probability of core damage during the **average POS** time duration ~~that the POS exists~~. **For some POSs this consists of two components: one that is activity driven, and is dependent on the number of times the activity is performed per POS, and one that is dependent on the time. An example of the former is the risk associated with drain-down. An example of the latter is the risk associated with the failure of an operating pump.** The probability of core damage, CDP, produced by any specific POS(i), $CDP_{POS(i)}$, is its **C**CDF multiplied by the **average** time duration, t, that the POS exists, $t_{POS(i)}$ **plus any constant contribution**. Thus, $CDP_{POS(i)} = \mathbf{C}CDF_{POS(i)} \times t_{POS(i)} + \mathbf{n_{(i)}.ACDP_{(i)}}$ **,** Where **C**$CDF_{POS(i)}$ and $t_{POS(i)}$ have inverse complementary units (per year X year or, per hour X hour), **and $n_{(i)}$ is the expected number of the activity for the POS and $ACDP_{(i)}$ is the CDP associated with the activity**. ~~Note that a POS with a relatively high~~

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			~~**C**CDF but a short duration may produce less risk than a POS of long duration with a relatively lower **C**CDF.~~ As long as the POSs are defined to be mutually exclusive, the risk produced by multiple POSs is represented by the sum of the probabilities of core damage of each POS. $CDP_{\Sigma POS} = \Sigma_i\ CDP_{POS(i)} = \Sigma_i\ (\mathbf{C}CDF_{POS(i)}\ X\ t_{POS(i)} + n.ACDP_{(i)})$ Note that the risk produced by multiple POSs is not simply the sum of the CCDFs from these POSs. In the summation shown above to determine the risk produced by multiple POSs, the **C**CDF from each POS is multiplied (weighted) by the respective duration of that POS. An aggregate core damage frequency produced by the multiple POSs can be defined **equating it to $CDP_{\Sigma POS}$, and replacing the time in the above equation by the fraction of a year for which the POS exists i.e.** $CDF_{\Sigma POS} = \Sigma_i\ (\mathbf{C}CDF_{POS(i)}\ X\ f_{tPOS(i)} + \mathbf{n_{(i)}.ACDP_{(i)}})$ where $f_{tPOS(i)}$ is the fraction of time (relative to the total duration of all POSs) that each POS exists. **Note that if evaluated in accordance with Section 2 of the combined standard, the at-power contribution to CDF should not be multiplied by the fraction of time at-power, since it is already accounted for.** The time, $f_{tPOS(i)}$ accounts for both the POS duration given it occurs and the frequency of outages involving POS (i) per calendar year. The derivation of this relationship and further explanation is provided in a non-mandatory Appendix B. “

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1.2.2.3	This section does not distinguish POSs of different outage types. It is discussed in Appendix A, and needs to be discussed here.	Qualification	Provide a description of outage types and their associated POSs, and explain how the risk metrics from different POSs of different outage types needs to be added.
1.2.2.4 LERF Endpoint	The emphasis should focus on the status.	Qualification	"The emphasis is more on containment isolation **status** than containment structural failure. **Containment structural failure is equally important when considering: (1) hydrogen generation for containments with reduced pressure capabilities (de-inerted Mark 1 and Mark 2 containments, Mark 3 and ice condenser containments) and (2) temporary containment penetrations of reduced pressure capability."**
1.2.3	Second paragraph – one typical use of LPSD analyses is to derive insights – this needs to be included.	Clarification	"…application being considered. **POSs in each type of outage (including unscheduled outages) are to be modeled in detail to permit identification of risk insights and to support risk management activities**."
1.2.3 3rd paragraph	The text description of the average annual outage needs to include reference to the number of entries into each POS to account for the transition risk (see comment 1.2.2.3). While this is implied, it is not explicit.	Qualification	Expand the discussion to include the need to specify the evolutions for the set of typical outages.
1.3	Configuration risk management is not equivalent to a LPSD PRA, and as such, it is not consistent with the objective of the standard.	Qualification	This section of the standard needs to be deleted and put in its own standard.
Sections 2.1 and 2.2	The lists of Acronyms and Definitions are not complete. (e.g., OE, average outage, boundary condition,…)	Clarification	Assure lists are complete.

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Section 2.2 Full power	ASME/ANS RA-S-2008 uses the term at-power rather than full power.	Clarification	*~~"full~~ **at-**power:* a POS"
Section 2.2 Risk metrics	The first sentence states that "Risk is generally defined as "frequency multiplied by consequence" for a set of accident sequences". This is not a definition but rather one measure of risk. It is more common to see risk defined as the set of triplets: what can go wrong, how likely is it, and what are the consequences. Also, it is not clear why the CDF is equated to a conditional probability of core damage.	Clarification	*"risk metrics (frequencies, conditional probabilities):* Risk is ~~generally defined~~ **often represented** as "frequency multiplied by consequence" for a set of accident sequences. However, risk is commonly represented by surrogate risk metrics based on the frequency of a particular consequence occurring. The standard risk metrics included in ASME/ANS RA-S-2008 are the frequency of core damage (CDF) and the frequency of a large, early release of radioactivity (LERF). These risk metrics are expressed as "frequencies," but are the ~~conditional~~ probabilit**ies**~~y~~ of the specified consequence occurring during a specified time duration. Thus, core damage frequency, CDF, is the ~~conditional~~ probability of core damage occurring during a specified time duration, usually a year. In assessing risk from full-power operation, analysts define a year variously to mean a "calendar year" (i.e., an average year with respect to the plant availability) or a "reactor operating year" (i.e., a year assuming the plant is operating at full power for the entire time). Either is acceptable as long as it is applied in a manner consistent with the data upon which it is based. For full-power PRAs, this distinction (between calendar year and reactor year) is not always made since the plant is typically operating for a large fraction of a year. However, for conformance with supporting requirement IE-C3 in the ASME/ANS RA-S-2008 [4]4 the plant availability factor must be included. See Section 1.2.2.3 for additional clarification."
2.2 Definitions	The definition for "refueling" is incorrect. Basically, the head can	Clarification	Use Standard TS definition for refueling which is defined as Mode 6, "**when *one or more* reactor vessel**

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	still be on in Mode 6 and may lift if the Reactor Coolant System (RCS) re-pressurizes. Mode definitions need to be consistent with Standard TS Mode definitions.		**head closure bolts is less than fully tensioned."**
2.2 Definitions	"Core Damage" needs to be defined, consistent with ASME/ANS RA-S-2008.	Qualification	The Standard needs a definition for core damage or the user has to state the technical bases for their definition of core damage.
Section 2.2 Low power	Definition of low power is confusing and needs to be clarified, but clarified in connection with defining at-power.	Clarification	Provide a definition of low power that makes the distinction with at-power clear.
Section 2.2 Initiating event	The definition of initiating event needs be the same for both this standard and in the ASME/ANS RA-S-2008 standard. However, additional text providing clarification of the definition for LPSD needs to be added. That is, both standards need to start with the same definition.	Qualification	*"initiating event:* ~~an incident that challenges or causes loss of a key safety function.~~ **any event either internal or external to the plant that perturbs the steady state operation of the plant, if operating, thereby initiating an abnormal event such as transient or LOCA within the plant. Initiating events trigger sequences of events that challenge plant control and safety systems whose failure could potentially lead to core damage or large early release.** Initiating events at low power include essentially the same types of events as at full power, and typically involve a reactor scram. Typical initiating events during shutdown include loss of decay heat removal and loss of inventory; i.e., a disturbance from the normal or planned state of responses for the shutdown, including those that are maintenance-induced. **Any event that requires operator actions to mitigate should be considered an initiating event, e.g., loss of operating train of RHR.** The definition and the likelihood of specific initiating events are dependent on the plant operational states. ~~[Note, this is a more general definition than that in ASME-2007, where it is specific for full-power conditions.]~~ "

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Section 2.2 Interfacing system LOCA	The definition of interfacing system LOCA (loss of coolant accident), refers to “drain down outside containment.” This probably needs to be better explained. Suggest providing an example.	Clarification	Provide a good example of this type of event.
Section 2.2	The term instantaneous CDF needs to be defined along with similar terms like CDF, CCDF, and CDP (core damage probability).	Clarification	Provide definitions
2.2 Precursor event	A definition of precursor event is given in this Section. Precursor event does not appear to be used in the standard and the definition probably needs to be removed. Also, the definition of precursor event provided here does not appear to be consistent with the way precursor is used in NRC precursor studies.	Clarification	Remove the definition.
Section 3.2	If the plant described in the example is an ice-condenser plant or a BWR, hydrogen control needs to be addressed. Differential pressure capability of temporary containment penetrations also need to be addressed.	Qualification	Include the impact of hydrogen control and temporary containment penetrations in the example.
3.5	In “Note that, this is 90% of the total CDF/LERF in any one POS”, the “total CDF/LERF in any one POS” is not defined, because the CDF of a POS does not appear to have been defined in Section 1.2.2.3.	Qualification	Provide a definition of CDF of a POS.
3.7	This Section’s discussion on SRs appears to be	Clarification	Move the discussion to Section 4.

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	out of place, i.e., before the SRs are discussed in Section 4.		
Table 3.7-1 POS-C2	Times after shutdown not appropriate.	Clarification	"Omit requirement to determine POS average durations ~~and times after shutdown~~ if only using instantaneous risk metrics. ~~and, conservatively short POS durations (i.e. times after shutdown) are assumed."~~
Table 3.7-1 IE-A1	The initiating event modeling completeness scope may not be sufficiently large for the planned evolutions as well as unplanned work.	Qualification	Delete
Table 3.7-1 IE-C4	This requirement does not provide any requirement – there does not appear to be any "standard" proposed.	Clarification	Develop requirement for what constitutes acceptable frequency criteria.
IE-A2	The human induced IEs are particularly important, so consider highlighting this as suggested here.	Clarification	Add to the discussion above the examples**: INCLUDE in the analyses both equipment and human-induced events.**"
IE-A9	Addresses support system initiators. It was deleted in the ASME/ ANS RA-S-2008 PRA standard; therefore, it was deleted in this standard. It is not clear if it was appropriate to remove it from the ASME standard, and not include it in the ANS standard.	Clarification	Provide technical justification why it should not be in the ANS standard.
IE-C4	Applying the same screening criteria in IE-C4 as in the full power standard is not appropriate because of the larger uncertainties in reliabilities during LPSD due to changing and unique plant configurations and activities.	Qualification	Modify IE-C4 to account for the large variability in system/train reliability during LPSD.
Section 4.4: Objectives	There are several issues related to the definitions of POSs.	Qualification	Expand the discussion to clarify how system configurations are addressed in relation to the definition of POSs in the standard. Explain the term

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	Whether the PRA is to be used for evaluating "average" CDF or an outage specific CDF, the system capabilities to respond to an initiating event should be of concern in defining the POSs, since these will determine the plant response. However, there is no specific mention of system capability. There are conflicting messages. POS-A5 seems to suggest that system success criteria may change during a POS, whereas POS-B3 requires a unique POS for different success criteria. AS-A1 requires "accounting for changing plant conditions within a POS". Furthermore, SY-18, SY-B10, 11, and 12, suggest that some system characteristics can, and needs to be specified as POS characteristics. If POSs are defined using macroscopic parameters, such as pressure ranges, water levels, vessel intact or open, then within a POS detailed system configurations could change. In this case, the different configurations and their duration would be captured in the system model. These relationships are not clear in the Standard.		constant boundary condition that is used in the objective statement. In addition, identify what characteristics are variable within a POS and where they are treated.
Table 4.4-2 POS-A2	The term "natural circulation basin cooling" is not a known term.	Clarification	"mechanism from natural circulation ~~basin~~ cooling to forced circulation"

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Table 4.4.-2 (*)	RCS configurations need to include whether temporary RCS penetrations are installed and their differential pressure capability. (*) = Supporting Requirements for Plant Operational State Analysis –High Level Requirement A, for POS-A2	Qualification	**“ …** not vented, **and whether temporary RCS penetrations are installed and their differential pressure capability;** “
Table 4.4-2 POS-A3	Since the RCS parameters typically change during a POS (e.g., water level will decrease during a drain down), it would be clearer to specify that it is the range of parameter values that are to be specified. The comment states: “Also, system alignments and component maintenance unavailabilities may all be variables within a POS (instead of being used to define the POS).” However, supporting requirements SY-18, SY-B10, 11, and 12, suggest that some system characteristics can, and needs to be specified as POS characteristics. The comment on POS-A5 states: “For example, as the success criteria and data are developed it may be found that early in an outage an alternate decay heat removal system may be unavailable for the duration of a particular POS due to the decay	Clarification	• **“Ranges of** RCS parameters, e.g. power level or decay heat level, temperatures, pressures, water levels. • **System characteristics, such as ….?** • **System success criteria?”**

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	heat being higher than the capacity of the system." This would seem to suggest that the system success criteria would be an appropriate characteristic of a POS.		
Table 4.4-2 POS–A4	It is inadequate to review plans for the next outage to ensure that the selections made in POS A-3 are adequate for risk informed decision making.	Qualification	Replace list with the following: **(1) Infrequently scheduled/unplanned work that could generate POSs not previously encountered (e.g. a forced outage to inspect SG tube leaks with fuel in vessel).** (2) **Earlier entry into a POSs resulting in substantially higher decay heat due to changes in critical path scheduling.**
Table 4.4-2 POS-A5	This appears to address system configuration. However, the text uses the words "changes in system success criteria, changes in alignment," etc. This seems to be more related to the evaluation of system success criteria than defining POSs.	Qualification Clarification	If this is intended to state that the POSs needs to be defined such that each system capability of responding to an initiating event is constant throughout the POS taking into account its changing configuration throughout the POS, please clarify. "ASSESS the ability of each system to mitigate ~~transient and LOCA~~ initiating events in each POS…. Strike out the specific examples of initiating events since the requirements should apply to all initiating events."
POS-A6	It is not clear what the sentence regarding interviews of similar plants intends – it appears that plant-specific interviews must be conducted, and if so, this sentence has no meaning.	Clarification	Delete sentence or clarify intent.
Table 4.4-3 POS-B1	The Statement of the SR is inconsistent with Standards practice in the use of the term shall. There is no action verb.	Clarification	"If POSs from a LPSD evolution are combined into groups to facilitate LPSD tasks ~~the grouping process and definition of final POS conditions shall ensure~~ **ENSURE** that the most

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			severe or constraining characteristics (with respect to core damage or large early release) of any group are chosen for the combined group. ~~This process shall include~~ **INCLUDE consideration of the** type and frequency of initiating events."
Table 4.4.-3 POS-B2	The SR uses the term key contributor which is inconsistent with ASME/ANS RA-S-2008.	Clarification	Replace the word "key" by "significant"
Table 4.4-3 and 4.4-4 POS-B1, B2; POS-C3	For capability category III, it is not clear that grouping of POSs could be permitted and still achieve the stated intent to identify the relative importance of significant contributors.	Qualification	For capability category III, no grouping of POSs needs to be made if the different POSs have different severity, constraining characteristics, plant impacts, and/or frequencies.
Table 4.4-3 POS-B4	In light of the comment on Section 1.2.2.3, the rationale for combining activity-based and time-based initiators is inappropriate. Besides this appears to be a requirement on the grouping of initiating event rather than POSs.	Qualification	Make the requirement the same for all three CCs
Table 4.5.1-1 HLR-IE-A	It is not necessary to specify the causes of the initiating events as being from internal event or external events. The intent is to identify the impact on the plant, not its cause. The intent of the additional words seems to be to clarify that individual POSs may have separate initiators.	Clarification	"The initiating event analysis shall provide a reasonably complete identification of initiating events **applicable to each** ~~for all~~ identified POS~~s~~, ~~including all internal events, and external events (except internal fires)~~."
Table 4.5.1-2 IE-A1	IE-A1 is a general statement concerning the identification of initiating events regardless of cause. The permissive statement "Human … can be postulated .. for each POS" is not a requirement and seems	Qualification	~~"Human … can be postulated for each POS. "~~

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	out of place. It can be dealt with in the identification of human failure events (HFEs) (see comments on Section 4.5.5).		
Table 4.5.1-2 IE-A2	The example of a misloaded fuel assembly as a potential initiating event for a reactivity addition is not understood, since the consequences would be zero until the plant was started up and reached a significant power level.	Clarification	Delete this example.
Table 4.5.1-2 IE-A2	Examples at the end of this commentary are disjoint and do not appear to match up with any specific category. The specific example of a heavy load drop would not seem to be a valid initiator.	Clarification	Tie examples to specific items and delete heavy load drop.
Table 4.5.1-2 IE-A4a	The system initiator evaluation for shutdown conditions needs to always include consideration of the system alignments due to the variance of alignments and out of service conditions of SSCs during outages.	Qualification	ASME/ANS RA-S-2008 IE-A4a for CC I should not apply to this standard; the CC II requirement should span CC I and II of this standard.
Table 4.5.1-2 IE-A5	Part (b) of ASME/ANS RA-S-2008 includes manual shutdowns with scrams occurring prior to reaching shutdown conditions; this is being duplicated for this standard, which would result in double-counting such events.	Qualification	Part (b) should not apply to this standard.
Table 4.5.1-3	The impact on the plant (e.g., loss of residual heat removal (RHR), loss of inventory) of operator-	Qualification	New SR: **INCLUDE human caused initiating events (identified in HLR-HR-J) as separate initiating event groups.**

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	caused initiating events may be no different from those resulting from hardware failure. However, they are potentially more significant because of the concern with need for the operators to recognize their error and effect on appropriate recovery. Because of their importance, they should not be grouped with other initiating events caused by random failures.		**COMMENT: an alternative approach is to assess the human caused and hardware caused contributions to the initiating event frequency separately.** See later comment regarding the need for HLR-HR-J.
Table 4.5.1-4	The impact on the plant (e.g., loss of RHR, loss of inventory) of operator-caused initiating events may be no different from those resulting from hardware failure. However, they are potentially more significant because of the concern with need for the operators to recognize their error and effect on appropriate recovery. Because of their importance, they should not be grouped with other initiating events caused by random failures.	Qualification	New SR IE-C01: **EVALUATE the frequency of human caused initiating events separately from those caused by hardware, using either data or human reliability analysis methods.** **Comment: Human caused initiating event needs to be addressed separately to facilitate the quantification of mitigation or recovery actions.**
Table 4.5.1-4 IE-C3	It is unclear what the standard intends with regards to accounting for the "time in a POS" in the IE frequency. Based on Section 1.2.2.3 where the overall frequency is weighted by time in the POS, it is assumed that the IE frequencies are intended to be "per unit time (1 year) spent in a particular POS".	Clarification	"CALCULATE initiating event frequencies on a per calendar year basis **for each POS**. Specifically, for each POS, ACCOUNT in the initiating event analysis for the fraction of time the plant is in the POS. **For example, if there is 1 initiating event in 20 years, but the total time in the POSs where the event can occur is 200 hours, then the IE frequency should be:** **((1/20yr) / (200hr/20yr)) x (8760hr/yr) = 44/POS-year."**
Table 4.5.1-4	This requirement	Qualification	Add a new requirement. **IE-C3a:**

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IE-C3	addresses those initiating events that are random in time, e.g., random failures of an RHR pump where it is important to account in the initiating event analysis for the fraction of time the plant is in the POS. It is not appropriate for event based initiating events (e.g. those resulting from a transition to a POS), where the frequency is evaluated by the frequency of transitioning to the POS, multiplied by the probability of occurrence given the transition. In addition, while this has some similarity to the ASME/ANS RA-S-2008 requirement, it does not make the distinction between CC I/II and CC III that the ASME/ANS RA-S-2008 standard does.		**When the initiating event is event driven, ACCOUNT for the frequency of the event in the evaluation of the initiating event frequency. DO NOT ACCOUNT for the fraction of time spent in the corresponding POS.**
Table 4.5.1-4 IE-C3	The requirement to project future expected outage plans in the baseline risk is inconsistent with the internal events practices, which allow for a lag between update of plant-specific experience.	Qualification	~~"ACCOUNT FOR differences between historical POS durations and frequencies over the period of POS occurrences in the historical database and those POS durations and frequencies in future plant operation that could be different from historical values."~~
Table 4.5.1-3 IE-C6, 7, 8, 9	Operator caused initiating events are likely to be the result of errors of commission during the conduct of specific evolutions, such as drain-down. This is recognized in the note preceding Table 4.5.5-2(G). It would be appropriate to include a new SR specifically	Qualification	NEW SR IE-C14: **QUANTIFY human caused initiating event frequencies using the requirements in Section 4.5.5-2(K). See later comment on HRA.** Delete the "or HRA" throughout.

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	addressing those IEs caused by operator error. The inclusion of the "or HRA" in each of the SRs IE-C 6 through 9 is not sufficient. In fact in IE-C6 there is no requirement associated with human reliability analysis (HRA); the requirement appears to be in the commentary. This needs to be a separate requirement.		
Table 4.5.2-2 AS-A1	The standard changes the structure of the requirements found in ASME/ANS RA-S-2008 and subtly rewords subpart (b) without a basis related to LPSD. The structure of ASME/ANS RA-S-2008 needs to be left as-is with the additional clarification provided in sub-part (a), and retain subpart (b) without modification.	Clarification	"USE a method for accident sequence analysis that**:** **(a)** explicitly models the appropriate combinations of system responses and operator actions that affect the key safety functions, accounting for changing plant conditions within a POS, for each modeled initiating event**;** **(b)** ~~CHOOSE a method that~~ includes **a graphical representation of the accident sequences in** an "event tree structure" or equivalent such that the accident sequence ~~logic (~~progression~~)~~ is **displayed;** ~~graphically represented~~.and **(c)** provides a framework to support sequence quantification."
Table 4.5.2-2 AS-A1	The requirement includes the following: "… actions that affect the key safety functions**, accounting for changing plant conditions within a POS**, for each modeled initiating event and provides a framework to support sequence quantification." The definition of POS includes the following: "plant operational (or operating) state. Each POS is a standard configuration of the plant	Clarification	Some commentary is needed to the effect that the accident sequence analysis should be valid for the range of plant conditions within the POS.

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	during which the **plant conditions** are relatively constant, **are modeled as constant**, and are distinct from other configurations in ways that impact risk" (emphasis added). These two statements appear at first glance to be inconsistent.		
Table 4.5.2-2 AS-A4/A5	There may be fewer formal procedures for dealing with occurrences at shutdown. ANS comment resolution stated "[w]ith the exception of Emergency Operating Procedures, formal procedures exist for all aspects of shutdown plant operation." Therefore, the SR discussion needs to acknowledge any associated challenges in indentifying shutdown operator actions in areas where formal procedures do not exist.	Clarification	A commentary on the availability and nature of shutdown procedures would be helpful.
Table 4.5.2-3 AS-B1	The term "system models" in ASME/ANS RA-S-2008 was changed to "systems analysis" in the standard without providing a basis related to LPSD – needs to use existing wording from ASME/ANS RA-S-2008 in the standard. The example added would probably be addressed in the HRA by a dependency between human error probabilities (HEPs). It will not necessarily be evident in the structure of the accident sequence.	Clarification	"INCLUDE the impact of initiating events on mitigating systems in the accident progression either in the accident sequence models or in the system~~s analysis~~ **models**." Reconsider the example.
Table 4.5.2-3	The standard changes the wording of	Clarification	~~"For each key safety function,~~ IDENTIFY ~~it's~~ **the** dependence **of**

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AS-B2	ASME/ANS RA-S-2008 without providing a basis related to LPSD – retain existing wording from ASME/ANS RA-S-2008.		**modeled mitigating systems** on the success or failure of preceding **systems,** functions**, or human actions**. INCLUDE the impact on accident progression**, either in the accident sequence models or in the system models**."
Table 4.5.2-3 AS-B3	The standard changes the wording of ASME/ANS RA-S-2008 without providing a basis related to LPSD – retain existing wording from ASME/ANS RA-S-2008.	Clarification	"INCLUDE the impact of the accident progression phenomena**, either in the accident sequence models or in the system models**."
Table 4.5.2-3 AS-B3	The added words to address plant changes which may occur while the plant operates in a particular POS are not consistent with the wording in AS-A1, and are less clear as to their intent.	Clarification	"For each accident sequence, IDENTIFY the phenomenological conditions created by the accident progression including those caused by ~~changes during the POS~~ **changing plant conditions within a POS**."
Table 4.5.2-3 AS-B6	The standard changes the wording of ASME/ANS RA-S-2008 without providing a basis related to LPSD – retain existing wording from ASME/ANS RA-S-2008.	Clarification	~~"INCLUDE events for which~~ **MODEL** time-phased dependencies **(i.e., those that change as the accident progresses, due to such factors as depletion of resources, recovery of resources, and changes in loads) in the accident sequences** ~~might exist~~. Examples are: (a) For SBO/LOOP sequences, ~~INCLUDE~~ key time-phased events**,** such as: (1) AC power recovery (2) DC battery adequacy (time-dependent discharge) (3) Environmental conditions (e.g., room cooling) for operating equipment and the control room (b) For ATWS/failure to scram events (for BWRs), ~~INCLUDE~~ key time-dependent actions such as: (1) Standby liquid control system (SLCS) initiation (2) Reactor pressure vessel (RPV)

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			level control (3) Automatic depressurization system (ADS) inhibit (c) Other events that may be subject to explicit time-dependent characterization include:”
Table 4.5.2-3 (**)	The examples are inadequate. (**) = “Supporting Requirements for Accident Sequence Analysis – High Level Requirement B, Item AS-B6	Clarification	Add for examples two key time phased dependencies, (1) initiation of PWR Gravity Injection before RCS boiling (boiling may negate elevation head for gravity injection if RCS vented via high elevation vent) and (2) Recovery of RHR function before RCS boiling (boiling may require RCS fill and venting of RHR pumps).
Table 4.5.4-2 SY-A1	The commentary is out of place. This requirement only refers to developing a system model. It would be more logical in SY-A3.	Clarification	Remove commentary and move to SY-A3
Table 4.5.4-2 SY-A5	If system configurations are variable within a POS, it might be worth noting in the commentary.	Clarification	Add commentary.
Table 4.5.4-2 SY-A11	There does not appear to be a requirement to model any variation in configuration. This SR could be modified to include this if necessary.	Clarification	Revise SR.
Section 4.5.5 HRA	This section relies heavily on the corresponding ASME/ANS RA-S-2008 standard section. However, in the ASME/ANS RA-S-2008 standard, there are no requirements that specifically deal with errors that result in an initiating event. This is primarily because, for the at-power POS, it is assumed that operator caused errors are included in the data for the more common initiating events, and	Qualification	Include: **HLR-HR-I: A systematic review of the relevant plant procedures shall be used to identify activities that could result in initiating events if incorrectly carried out.** **HLR-HR-J: Human failure events shall be defined that represent the impact of not correctly executing plant evolutions and result in an initiating event.** **HLR-HR-K: the assessment of the frequencies of operator induced initiating events shall be performed using a well-defined and self-consistent process that**

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	included as response actions in fault trees for support system initiators. A significant contribution to low power and shutdown (LP&S) risk is from errors in performing specific evolutions (e.g., drain down). The analysis of these errors has some similarities with both pre-initiator and post-initiator events. The identification is addressed in IE-A1. The quantification is addressed in IE-C6 and IE-C7, and relies on the quantification of post-initiator HFEs. However, in some ways the modeling of the initial error is similar to modeling of pre-initiator HFEs, since they result from errors while performing a planned evolution following a procedure. Modeling an initiating event resulting from an error commission needs to involve taking account of the possibility that the operators would recover before the initiating event occurs. The failures to recover from the initial error before an initiating event occurs would be modeled as response actions. Furthermore, given that an initiating event has occurred, there needs to be a dependency between the initiating event and the operator actions to recover from or mitigate the consequences. As a result these errors		**addresses the plant-specific and evolution specific influences on human performance.**

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	should not be grouped with hardware failures in the definition of the initiating event. This section needs to include HLRs and associated SRs related to the identification, definition, and quantification of HFEs resulting in initiating Qualification events.		
Section 4.5.5 HLR-HR-A	HLR-HR-A inadvertently omitted from standard (SRs are included.)	Clarification	Add HLR-HR-A back to standard.
Table 4.5.5-2(A) HR-A1	Changes to ASME/ANS RA-S-2008 are not properly identified with underline.	Clarification	"For equipment **and POSs** modeled in **the LPSD quantitative** PRA, IDENTIFY,…"
Table 4.5.5-2(A) HR-A2	Including instrumentation needed for manual actuation substantially broadens the scope of the pre-initiator analyses and may not be achievable as written – the scope needs to be restricted to those manual actuations where the automatic would normally not be available due to POS conditions.	Qualification	"..on the automatic initiation of standby safety equipment or on the indications to operators of the need for manual actuation**, when automatic actuation would normally be unavailable for a particular POS**."
Table 4.5.5-2(D) HR-D2	The standard provides a revision to the ASME/ANS RA-S-2008 standard CC II only – does this format imply that CC I and III are unchanged? It appears that this is not the convention, based on HR-D7.	Clarification	Add the following: **The requirements for capability categories I and III are unchanged from ASME-2007. For capability category II:**
Table 4.5.5-2(D) HR-D5	The commentary states without justification that dependencies can occur "across POS". Since the CDP for each POS is separately calculated per	Qualification	"Dependency can vary POS by POS ~~and can occur across POS"~~

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	Section 1.2.2.3, this makes no sense and needs to be deleted, unless a justification is provided.		
Table 4.5.5-2(D) HR-D7	The proposed LPSD requirement is to make the ASME/ANS RA-S-2008 capability category III requirement a universal requirement. This would seem to be overly restrictive and not justified for capability category I. It is not clear that pre-initiators are more significant to LPSD conditions compared to at-power conditions.	Qualification	Recommend accepting the ASME/ANS RA-S-2008 without change.
Table 4.5.5-2(E) HR-E1	The commentary states : "… Consider the fact that personnel are less familiar with LPSD procedures". This statement needs to be softened, since it is not a "fact" that personnel have less familiarity with these procedures. It needs to consider the use of contractor personnel during outages.	Clarification	"… Consider ~~the fact~~ that personnel, **including contractor personnel,** ~~are~~ **may be** less familiar with LPSD procedures"
Table 4.5.5-2(G)	The note raises many issues associated with the analysis of LP&S human reliability but that are not necessarily associated only with the quantification of post-initiator HEPs. Some are clearly related to those HFEs that cause the initiating events. It is not clear what one is to do with this information.	Clarification	The relevant points needs to be reflected either directly in the SRs or in the comments to the SRs as appropriate
Table 4.5.5-2(G)	Some notes on this table are recognized as important, but are not relegated to the level of a requirement and need to	Clarification	"The requirement for a formal procedure can be relaxed for scenarios late in the outage, with very long time for recovery"

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	be.		
Table 4.5.5-2(H) HR-H2	The commentary changes the requirement for procedures without justification.	Qualification	The commentary needs to be deleted because it is too ambiguous. ASME guidelines for this requirement are sufficient. ~~"The requirement for a formal procedure can be relaxed for scenarios late in the outage, with very long time for recovery. (See note at HR-G)~~. Note that…"
Table 4.5.5-2(I) HR-I2	The standard changes the wording of ASME/ANS RA-S-2008 without providing a basis related to LPSD – retain existing wording from ASME/ANS RA-S-2008.	Qualification	"DOCUMENT **the processes used to identify, characterize, and quantify the pre-initiator, post-initiator, and recovery actions considered by the <u>LPSD</u> PRA, including the inputs, methods, and results. For example, this documentation typically includes** ~~HRA in enough detail to reproduce results and permit reviewers to understand limitations imposed by the models, assumptions, and data, including the following~~:"
Table 4.5.5-2	Some notes on Table 4.5.5-2(G) (p. 77) are recognized as important but are not relegated to the level of a requirement. Why not?	Qualification	As appropriate, integrate the notes into the standard as requirement(s).
Section 4.5.6 Data Analysis	Much of the commentary in this section is speculative and could be eliminated. Specific instances are given below. There seems to be an underlying concern that the parameters will vary from POS to POS, and while this is certainly true for some, e.g., unavailability due to maintenance, it is not clear that failure probabilities are different.	----------	See comments below.
Table 4.5.6-5	Data is required to support conversion to per calendar year. For example, if the approach uses a POS frequency of POSs per outage, then the number of outages	Clarification	Add a new SR to address this data. Provide a cross reference to Table 4.4-4 where much of this (e.g., number of outages, outage types, number of POSs, durations of POSs) is addressed.

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	(outage types) per calendar year is necessary.		
DA-E3	The standard changes the wording of ASME/ANS RA-S-2008 without providing a basis related to LPSD – retain existing wording from ASME/ANS RA-S-2008.	Qualification	Recommend accepting the ASME/ANS RA-S-2008 without change.
Table 4.5.6-2(C) SRs DA-C1,	The commentary contains the sentence "This can only be done on a POS specific basis", which is to some extent contradicted by the second sentence. This statement appears to be too strong. (Also in DA-C2, DA-C3, DA-C6) The second paragraph in DA-C1 is unnecessary, since initiating event frequencies are addressed in element IE	Clarification	"This ~~can only~~ **needs to** be done on a POS specific basis." However, a better solution would be to require these activities to be performed on a POS basis, and have additional SRs to discuss the grouping of data from different POSs.
Table 4.5.6-2 (C)	DA-C1 – commentary is written as a requirement, and actually needs to be a requirement.	Qualification	The comment "Use of the same estimates in multiple POS requires care and justification" needs to be made a requirement since it is unique to LPSD and spans across POSs. It could be part of the documentation requirements.
DA-C2	The examples in the first bullet are not relevant. Failure of a pump due to draining the RCS would be a consequential failure that is not included in the failure rate; calibration errors are treated as separate failures. The second and third bullets address causes of failures, and while they may occur during specific POSs, they would not necessarily affect the failure probabilities or	Clarification	Delete the first three bullets.

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	unavailability for only those same POSs.		
DA-C12	This SR in the ASME/ANS RA-S-2008 distinguishes between CC I and CCs II and III.	Clarification	"CC I: EVALUATE the duration of the actual time that the equipment was unavailable for each contributing activity. <u>ACCOUNT for LPSD POS and special maintenance activities.</u> Special attention needs to be paid to the case of a multi-plant site with shared systems, when the Specifications (TS) requirements can be different depending on the status of both plants. Accurate modeling generally leads to a particular allocation of outage data among basic events to take this mode dependence into account. In the case that reliable estimates or the start and finish times are not available, **provide conservative estimates.** **CC II and III as in LP&S standard."**
DA-C13	The second statement in first bullet is incorrect. Corrective maintenance events are not necessarily independent; they are correlated by Tech spec requirements.	Clarification	• "Equipment unavailabilities are correlated by planned maintenance configurations~~; they are no longer independent as for corrective maintenance at power"~~
DA-E1	Document justification for use of full power or other POS data.	Qualification	Add: **"(k) justification for use of full power or other POS data."**
IF-A1	The commentary would fit better with SR IF-A1a. Furthermore, the commentary discusses a potentially significant feature of LP&S operation, which is that the barriers that would be used to define flood areas could be removed or seriously impaired for certain portions of the time. This could be dealt with here, or perhaps better in IF-C3b. However, would also need to have an SR that deals with the	Qualification	Move commentary to either SR IF-A1a or IF-C3B, as appropriate, and add requirement on unavailability of the barrier.

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	unavailability of the barrier.		
IF-C2	This SR from ASME/ANS RA-S-2008 needs to be modified to address the flood mitigation features which may reasonably be unavailable during LPSD conditions.	Qualification	For each…propagation**, considering the POS-specific configuration impacts**.
IF-C3b	The potential for inter-area propagation during LPSD needs to be considered for all capability categories.	Qualification	Make ASME/ANS RA-S-2008 capability category III requirement applicable across all categories.
IF-D6	The significance of maintenance-induced floods during LPSD needs to require the capability category III SR from ASME-2007 for all capability categories.	Qualification	Make ASME/ANS RA-S-2008 capability category III requirement applicable across all categories.
IF-C3b	The requirement for CCIII needs to be the same for CCII and CCIII.	Clarification	For CCII AND III use the CC III SR
QU-A4	QU-A4 seems to be missing: no reference is made to ASME QU-A4. Is this intentional?	Clarification	Reference ASME QU-E4.
Table 4.5.9-1 HLR-LE-F	The second sentence, dealing with sources of uncertainty, is too general. The language from ASME PRA Standard (ASME/ANS RA-S-2008) needs to be used: "Sources of model uncertainty and related assumptions shall be identified and their potential impact on the results understood."	Clarification	"Modify the sentence: ~~Sources of uncertainty shall be identified and their impact characterized~~ **Sources of model uncertainty and related assumptions shall be identified and their potential impact on the results understood."**
Table 4.5.9-2(A) LE-A1	Example (e) needs to be modified to reflect that the containment might be open during certain POSs.	Clarification	"(e) containment integrity (e.g., **open,** vented, bypassed, or failed)"
Table 4.5.9-2(A)	The POS-specific status of containment needs to	Qualification	"…(c) Status of containment isolation (failure **<u>or POS-specific status</u>** can

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LE-A1	be specifically identified due to the potential significance.		result…)"
Table 4.5.9-2(B) LE-B1 Commentary	Experimental and analytical work regarding oxidation in an air environment has been substantially completed. Thus, the consideration of air oxidation should not be indicated to be out of scope.	Qualification	~~"The potential for air oxidation and its effect on releases of radionuclides, such as ruthenium, is being researched. Therefore this issue is beyond the state-of-the-art and is out of the scope of this standard, at this point."~~
Table 4.5.9-2(B) LE-B2	The revisions to ASME/ANS RA-S-2008 for capability categories II and III need to be discussed and justified in the Commentary. It is not consistent with the philosophy in the ASME/ANS RA-S-2008 standard that realistic analyses would be used for significant contributors for CC II and for all contributors for CC III.	Qualification	Suggest reverting to the wording in the ASME/ANS RA-S-2008 standard.
Table 4.5.9-2(B) LE-B2	The second requirement is more applicable to LE-B3, where it seems to be covered by the requirement to use the applicable requirements of Table 4.5.3-2(b) of the ASME/ANS RA-S-2008 standard.	Clarification	Either delete the paragraph beginning "USE plant-specific containment …", or incorporate any new thoughts into LE-B3.
LE-C1a	There is no LE-C1a in ASME-2007; this item needs to administratively refer to LE-C1.	Qualification	Add: **Refer to ASME/ANS RA-S-2008 [4], SR LE-C1.**
LE-C1a	CC II: (The SR in the ASME/ANS RA-S-2008 allows the analyst to calculate source terms, however, it is required here for LPSD without providing justification of why it is needed.)	Qualification	~~"IDENTIFY sequences … to define LER."~~ Or identify a new requirement and provide commentary ~~"The criteria in Appendix A of~~

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			~~NUREG/CR-6595, Rev.1 for LER provide an acceptable alternative during transition from full power operation to shutdown operation."~~ Add: **Refer to ASME/ANS RA-S-2008 LE-C1**
LE-C1a	CC III: (The SR in the ASME/ANS RA-S-2008 requires the analyst to calculate source terms, however, here for LPSD the analyst is required to perform a consequence analysis without providing justification of why it is needed.)	Qualification	"Identify LER sequences from the results of the accident progression **and source term** analysis ~~by carrying out the appropriate consequence calculations~~." Add: **Refer to ASME/ANS RA-S-2008 LE-C1**
LE-C1b	LER screening needs to be based on the time before release to the environment rather than the time before core damage.	Qualification	Remove Criterion 2. "Criterion 2: The time available for protective actions (e.g., evacuation and sheltering) before **radionuclide release to the environment** ~~core damage~~ in the scenario analyzed can be demonstrated to be sufficient to allow effective protective actions to be carried out."
LE-C8b, LE-C9b	Proposed change would not appear to have any impact on the analysis performed, since current "engineering analysis" would generally be equivalent to proposed "realistic" analysis. Change is also not unique to LPSD.	Qualification	Modify Requirement to read: **Same as ASME/ANS RA-S-2008.**
LE-C10	This ASME/ANS RA-S-2008 SR is omitted from the standard.	Qualification	Modify Requirement to read: **Same as ASME/ANS RA-S-2008.**
LE-D2	There is no apparent reason to include proposed commentary since below-grade failures are no more or less likely for LPSD events. LE-C1	Clarification	Commentary: " ~~Containment failures below ground level may not be a large early release even if the timing is early. Such failures may arise as a result of failures in the basemat region. "~~

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	addresses whether or not the release will contribute to LERF.		
LE-D5	Proposed change would replace the more complete coverage of this item in the full power standard with a vague description. No rationale for this change for LPSD is provided.	Qualification	Modify Requirement to read: **Same as ASME/ANS RA-S-2008.**
LE-D6	Proposed change for CC I would also be applicable to CC II and III.	Qualification	"Include the proposed change for all Capability Categories: …INCLUDE consideration of **operator actions required to establish containment closure, time available and time required for closure, and** of both…"
LE-D6	Available time for containment closure will vary between shutdown initiators. The time to RCS boiling following a loss of inventory may be reduced compared to a loss of RHR function. Closure time needs to consider containment environmental impacts if crediting any recovery following RCS boiling with an open RCS.	Qualification	Add to Cat I: **Closure time needs to consider the time to RCS boiling which may vary between loss of RCS inventory and loss of RHR events. Closure time following RCS boiling with an open RCS needs to consider environmental impacts (such as fog, noise, humidity, temperature, radiation).**
LE-E3	Proposed changes for CC II and III would not appear to have any impact on the analysis performed. Changes are also not unique to LPSD.	Clarification	Modify Requirement to read: **Same as ASME/ANS RA-S-2008.**
LE-F1a	The standard changes the wording of ASME/ANS RA-S-2008 for capability category II/III without providing a basis related to LPSD – retain existing wording from ASME/ANS RA-S-2008.	Qualification	Modify Requirement to read: **Same as ASME/ANS RA-S-2008.**
Section 4.6	This section is written in such a way that it would be extremely difficult to use. There is no	Qualification	This needs to be rewritten, to parallel the external events sections of the standard.

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	parallelism to the way in which external events are treated in the ASME/ANS RA-S-2008 combined standard. Some major differences are: • A new set of technical elements has been defined. While there is some logic to this, they are different from the ones in the external events part of the at-power standard. • Correspondingly, there are new high level requirements that differ from those in the external events part of the Standard. • The way the requirements are linked back to the External event HLRs and corresponding SRs is convoluted and would be difficult to use. For example, EXT-D2 contains “The ***relevant part*** (emphasis added) of the Requirements under "HLR-ANA-C, Systems Analysis and Quantification" in Section 3.5.4 of the ANS		

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	Standard. Furthermore the commentary states: “This includes both the relevant part of the High Level Requirement labeled HLR-ANA-C and the relevant part of the Supporting Technical Requirement ANA-C1”. • In light of the above, this part of the standard looks more like a plan for how to develop requirements than the requirements themselves. • The Index numbering is confusing, because HLR-EXT-A through D already exist in the combined standard, where they are related to Screening and conservative analysis.		
Section 4.6.3	This section identifies seven broad categories of analysis work. These are somewhat akin to the technical elements of the combined standard. The second “broad category” is “Identification of each Plant Operational State included in the external-events analysis”. This should not be a separate work element. The external event analysis needs to be performed	Qualification	Delete this as a category, and delete the corresponding High Level requirement, EXT-C.

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	for each POS that has been defined in Section 4.4.		
6.3	This section needs to provide more guidance for review of the LPSD PRA specific element.	Qualification	Provide additional guidance.
7	Configuration risk management is not equivalent to a LPSD PRA, and as such, it is not consistent with the objective of the standard.	Qualification	This section of the standard needs to be deleted and put in its own standard.
8	Version 6(c), Section 1.3.3, 3rd paragraph: The 2nd sentence needs revision. Frequencies of initiating events may be stated per year (although it could be just as easily stated per hour), but equipment and human failures (rates?), and equipment unavailabilities are not. Unavailability is dimensionless.	Qualification	The recommended resolution was accepted but the text now appears in Section 1.2.2.3 without the recommended change.
Appendix C	Configuration risk management is not equivalent to a LPSD PRA, and as such, it is not consistent with the objective of the standard.	Qualification	This appendix of the standard needs to be deleted and put in its own standard.
Appendix D	Configuration risk management is not equivalent to a LPSD PRA, and as such, it is not consistent with the objective of the standard.	Qualification	This appendix of the standard needs to be deleted and put in its own standard.