Febrary 25, 2003

MEMORANDUM TO: Alan M. Rubin, Acting Chief
Probabilistic Risk Analysis Branch
Division of Risk Analysis & Applications

THRU: Mary T. Drouin **/ RA /**
Probabilistic Risk Analysis Branch
Division of Risk Analysis & Applications

FROM: Amarjit Singh **/ RA /**
Probabilistic Risk Analysis Branch
Division of Risk Analysis & Applications

SUBJECT: NOTICE OF A PUBLIC WORKSHOP WITH INTERESTED STAKEHOLDERS FOR FURTHER DISCUSSION REGARDING THE USE AND APPLICATION OF THE ASME CONSENSUS PRA STANDARD AND THE NEI PEER REVIEW PROCESS (i.e., DG-1122, “DETERMINING THE TECHNICAL ADEQUACY OF PRA RESULTS FOR RISK-INFORMED ACTIVITIES”)

DATE AND TIME: March 11, 2003
9:00 a.m. - 5:00 p.m.

LOCATION: Double Tree Hotel
1750 Rockville Pike
Rockville, Maryland

PURPOSE: To further discuss and solicit comments on the approach and guidelines in DG-1122, “Determining the Technical Adequacy of PRA Results for Risk-Informed Activities,” and the associated draft Standard Review Plan Chapter 19.1.

Attached is an agenda for the meeting. A draft copy of NRC preliminary views on the terms “important,” “dominant”, and ”significant” will be publically available on February 28, 2003 for review and comment.

Persons other than NRC staff and NRC contractors interested in making a presentation at the workshop should notify Amarjit Singh, Office of Nuclear Regulatory Research, MS: T-10E50, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, (301) 415-6243, email: axs3@nrc.gov

PARTICIPANTS:	NRC	Industry
	Mark Cunningham	A. Pietrangelo, NEI
	M.Drouin	B. Bradley, NEI
	M. Rubin	R. Grantom, South Texas
	G. Parry	D. Brewer, Duke Power
	B. Hardin	ASME
	A. Singh	

Attachment: Meeting Agenda

*Meetings between the NRC technical staff and applicants or licensees are open for interested members of the public, petitioners, interveners, or other parties to attend as observers pursuant to “Commission Policy Statement on Staff Meeting Open to the Public,” 65 Federal Register 56964, 9/20/2000. Members of the public who wish to attend should contact Amarjit Singh at (301) 415-6243 or axs3@nrc.gov.

Distribution:
Hard Copy

DRAA Chron
PRAB r/f
ACRS (M.Snodderly)
SCollins, NRR
ACThadani, RES
GMHolahan, NRR
JStrosnider, RES
SFNewberry, RES
MEMayfield, RES
CEAder, RES
MCunningham, RES
AKuritzky, RES
WB Hardin, RES
Jmoore,OGC
WNorris, RES
MAAitcheson, RES
MJVirgilio, NMSS
MAAitcheson, RES
DMatthews, NRR
CGrimes, NRR
MJohnson, NRR
WBeckner, NRR
GWParry, NRR
MRubin, NRR
ASingh, RES
HMiller, Region I
LReyes, Region II
JDyer, Region III
EMerchoff, Region IV
OPA
PMNS

DOCUMENT NAME: C:\ORPCheckout\FileNET\ML030620645.wpd
OAR in ADAMS? (Y or N) Y ADAMS ACCESSION NO.: ML 030620645 TEMPLATE NO. NRC-001
Publicly Available? (Y or N) Y DATE OF RELEASE TO PUBLIC Immediate SENSITIVE? N
To receive a copy of this document, indicate in the box: "C" = Copy without enclosures **"E"** = Copy with enclosures **"N"** = No copy
* see previous concurrences

OFFICE	DRAA/PRAB		DRAA/PRAB		DRAA/PRAB					
NAME	ASingh		MDrouin		A. Rubin					
DATE	02/ 25 /2003		02/ 25 /2003		02/ 25 /2003					

(RES File Code) RES ______

Attachment

Public Workshop
DG-1122 (An Approach for Determining the Technical Adequacy of PRA Results for Risk-Informed Activities) and SRP Chapter 19.1

March11, 2003

Preliminary Agenda

Time	Item
9:00 to 9:15 am	NRC: Introduction • Welcome • Overview/purpose of DG/SRP
9:15 to 11:15 am	Open Discussion on DG-1122, Appendices, and SRP Chapter 19.1 (Includes time for a break)
11:15 to 11:45 am	ASME: Presentation on ASME response to NRC's position on ASME-RA-S-2002
11:45 to 1:00 pm	LUNCH
1:00 to 2:30 p.m.	Open Discussion on the definitions of "Dominant," "Significant," and "Important" as used in the standard
2:30 to 2:50 p.m.	BREAK
2:50 to 4:30 p.m.	Open discussion on NEI/Industry Self-Assessment Process
4:30 to 5:00 p.m.	Wrap-up, future activities etc.

PROPOSED RESOLUTION FOR USE OF TERMS: DOMINANT, IMPORTANT, SIGNIFICANT

New Definitions, Section 2 —

Following definitions will need to be added to Section 2. NOTE: Numerical values are suggestions that are compatible with current PRA practice.

Significant sequence:
Those sequences, when ranked, comprise 95% of the core damage frequency or that individually contribute more than 1% to the CDF.

Significant initiating event:
Those initiating events that have the potential to contribute to the set of significant sequences.

Significant cutset (relative to CDF):
Those cutsets, when ranked, comprise 95% of the CDF or that individually contribute more than 1% to CDF.

Significant cutset (relative to sequence):
Those cutsets, when ranked, comprise 95% of the sequence CDF or that individually contribute more than 1% to the sequence CDF.

Significant basic event:
Those basic events (i.e., equipment unavailabilities and human failure events) that have a fussel-vesely importance greater than 0.005 and a risk-achievement greater than 2.

Significant accident progression sequence:
Those sequences, when ranked, comprise 95% of the large early release frequency or that individually contribute more than 1% to the LERF.

Significant severe accident phenomena:
Those severe accident phenomena that have the potential to contribute to the set of significant accident progression sequences.

Significant containment challenges:
Those containment challenges that have the potential to contribute to the set of significant accident progression sequences.

Key sources of uncertainty and assumptions:
The sources of uncertainty and assumptions that have the potential to impact the significant sequences.

Severe accident phenomena:
The phenomena (e.g., hydrogen combustion) that occurs during the accident (core melt) progression.

Containment challenge:
Those phenomena, equipment failures, and human failure events that have the potential to threaten or bypass the containment pressure boundary.

Containment failure mode:
The different end states (e.g., early liner melt-through) of the accident progression sequences modeled in the containment event tree (or equivalent structure) that lead to a radionuclide release.

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
1.3	...that determine the risk ***significance*** of the proposed changes.	Delete the term "risk"	proper use of word
Tbl 1.3-1 Criteria 1	**Cat I:** ...relative ***importance*** of the contributors... **Cat II**: ...relative ***importance*** of the ***dominant*** contributors... **Cat III:** ...relative ***importance*** of the contributors...	**Cat I:** ...relative importance of the contributors... **Cat II**: ...relative importance of the significant contributors... **Cat III:** ...relative importance of the contributors...	
Tbl 1.3-1 Criteria 2	Cat II: Use of plant-specific data/models for the ***dominant*** contributors	Cat II: Use of plant-specific data/models for the significant contributors	
2.2 core damage	...enough of the core to cause a ***significant*** release.	...enough of the core, if released, to result in adverse, offsite public health effects.	
2.2 PRA upgrade	the incorporation into a PRA model of a new methodology or ***significant*** changes....	The incorporation into a PRA model of a new methodology or changes that have the potential to impact the significant sequences	
2.2 Resource expert	knowledge of a particular technical areas of ***importance*** to a PRA	delete the words "importance to"	not needed
2.2 screening analysis	...contribution to the probability of a ***significant*** accident....	Reword: ...contribution to the probability of a significant accident sequence....	
3.3.1	....changes in maintenance unavailability are too small to consider ***significant*** impacts on the reliability of SW pumps...	delete the word "significant"	not needed
3.4	...the standard lacks specific requirements, their ***significance*** to the application shall be assessed.... If the absent requirements are not ***significant***... If the absent requirements are ***significant***....	Replace the word "significance" with "relevance" and "significant" with "relevant"	more appropriate term
3.5	...then determine if the difference is ***significant***....Acceptable requirements for determining the ***significance*** of this difference include the following: (a) The difference is not applicable or does not effect... (b) Modeled accident sequences accounting for at least 90% of CDF/LERF, as applicable.... Determination of ***significance*** will depend.... If the difference is not ***significant***.... If the difference is ***significant***...	...then determine if the difference is relevant or significant......Acceptable requirements for determining the differences include the following: (a) The difference is not relevant if it does not affect the quantification.... (b) The difference is not significant if the accident sequences significant to CDF/LERF, as applicable.... These determinations will depend.... If the difference is not relevant or significant, then.... If the difference is relevant or significant, then....	Relevant and relevance are more appropriate in this paragraph and are defined in the text. Text changed to match definition of significant.

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
3.6	Second example of supplementary requirements: It is desired to rank the snubbers in a plant according to their risk ***significance*** for...... snubbers are considered safety-related,......the safety ***significance*** of snubbers can be approximated by the safety ***significance*** of the components that they support for the events in which the snubbers are safety ***significant*** and ..... to rank the safety ***importance*** of the snubbers.	..... delete the word "risk" significance.... .....delete the "safety" from this paragraph...	Not needed Not needed
4.3.6	(b) technical experts with knowledge of a particular technical area of ***importance*** to the issue.	.... replace the words "of importance" with "relevant"	relevant is more appropriate than importance
IE-B4	..... those categories with ***significant***ly different plant response impacts	Delete "significantly" and clarify: ..... those categories with different plant response impacts (i.e., different success criteria).....	
IE-C12	....could ***significant***ly influence the ISLOCA frequency....	Delete the word, "significantly"	not needed
IE-D3	(j) DOCUMENT the ***important*** assumptions made in the analysis that affect the results	Delete the word, "important"	not needed
4.5.2.1	(a) ***significant*** operator actions,...... that can alter sequences are appropriately included....	Delete the word, "significant"	not needed
AS-A10	Cat II: .... DEVELOP the accident sequence model to sufficient detail that ***significant*** differences in requirements on systems.......If, however, choosing one over another ***significant***ly changes the requirements...	Delete the Words, "significant and significantly"	not needed, the example clarifies what differences should be considered
Tbl 4.5.3-1 HLR-SC-B	...... determination of the relative impact of success criteria on SSC and human action ***importance***, and the impact of uncertainty on this determination.	...... and determination of the relative impact of success criteria on the risk importance of the SSCs and human actions.	Uncertainty addressed in QU
SC-B1	Cat II: ....if such supplemental analyses do not affect risk ***significant*** CDF/LERF sequences. Cat III: USE realistic plant-specific.....success criteria requiring detailed computer modeling.	Cat II: leave as is Cat III: USE realistic plant-specific.....success criteria requiring detailed computer modeling. DO NOT USE assumptions that could yield conservative or optimistic success criteria	Cat II: Proper use of term Cat III: B6 more appropriate with B1, move to B1

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
SC-B6	Cat I: If ***significant***ly conservative or optimistic assumptions have been made in performing success criteria, EVALUATE their impacts on CDF/LERF. Cat II: If ***significant***ly conservative or optimistic assumptions have been made in performing success criteria, QUANTIFY their impacts on CDF/LERF. Cat III: DO NOT USE assumptions that could yield conservative or optimistic success criteria	delete the entire SR Cat I and II: redundant with QU-E4 Cat III: move to SC-B1	redundant with SC-B1, and QU-E4
SC-C1	Cat I: DOCUMENT ***important*** assumptions.... IDENTIFY ***significant***ly conservative....assumptions and their general impacts on the results. Cat II and III: DOCUMENT....***important*** assumptions...	Delete “important” and “significantly” Cat I: ....IDENTIFY conservative or optimistic assumptions.	– terms not needed – Cat I: deleted “their general impacts on the results” to be consistent with SC-B1 Note that an inconsistency exists between (a) in Cat III in SC-C1 with SC-B1/6
SC-C3	....each approach results in ***significant***ly different PRA results or insights.	....each approach results in different PRA results or insights (e.g., different significant sequences).	
SC-C4	(e) identification of ***important*** assumptions used in establishing success criteria	(e) identification of assumptions used in establishing success criteria that affect the results	consistent with other documentation SRs
SY-A14	(d) It is shown that the omission of the contributor does not have a ***significant*** impact on the results	(d) delete the requirement	not needed
SY-B5	(c) an evaluation that demonstrates that excluding the dependency does not ***significant***ly affect the system model	delete the term “significantly”	not needed
HR-D2	Cat II: USE detailed assessment ....for ***dominant*** system contributors. Screening values.....for systems that do not appear in the ***dominant*** sequence.	Cat II: USE detailed assessments .... for systems that appear in the significant sequences. Screening values .... for systems that do not appear in the significant sequences.	Consistent with good PRA practice
HR-E2	Cat II and III: ...the performance of a response action in ***dominant*** sequences...	Cat II and III: ...the performance of a response action in significant sequences...	Consistent with good PRA practice

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
HR-G1	Cat I: ...of the HEPs in ***dominant*** accident sequences that survive initial quantification. Screening values may be used .... in non-***dominant*** sequences. Cat II and III: ...Screening values may be used for ....appear in non-***dominant*** sequences.	Cat I: ...of the HEPs in significant accident sequences that survive initial quantification. Screening values may be used .... in the non-significant sequences. Cat II and III: ...Screening values may be used for ....appear in non-significant sequences.	Consistent with good PRA practice
HR-G5	Cat II: BASE the required time to complete actions in ***dominant*** scenarios on actual time measurements.....	Cat II: BASE the required time to complete actions in significant sequences or in scenarios that contribute to significant sequences on actual time measurements.....	
HR-H1	Cat I and II: ....or components contributing to the ***dominant*** sequences. Recovery actions.....	Cat I and II: ....or components contributing to the significant sequences. Recovery actions....	
HR-I1	(d)(5) all HEPs for each post-initiator human action and ***significant*** dependency effects	(d)(5) delete the term “significant”	not needed
Tbl 4.5.6-1 HLR-DA-D	...Parameter estimates for the ***important*** parameters shall be accompanied by a characterization of the uncertainty.	.....Each parameter estimate shall be accompanied by a characterization of the uncertainty.	Make consistent with HLR in Tbl 4.5.6-2(d)
DA-C12	Cat II and III: ...INTERVIEW the plant... components, trains, or systems in ***dominant*** accident scenarios...	Cat II and III: ...INTERVIEW the plant... components, trains, or systems in significant accident sequences or scenarios that contribute to the significant sequences...	
DA-D1	Cat II: Calculate realistic parameter estimates for ***dominant*** contributors; if sufficient plant-specific data....	Cat II: Calculate realistic parameter estimates for significant basic events; if sufficient plant-specific data....	
DA-D3	Cat II: ...the parameter estimates that ***contribute measurably*** to CDF and LERF. 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. Acceptable systematic....	Cat II: ...the parameter estimates of the basic events significant to CDF and LERF. Acceptable systematic....	
DA-D5	Cat II: ...for estimating CCF parameters for ***dominant*** CCF contributors:...	Cat II: Replace “dominant CCF contributors” to significant CCF basic events:”....	

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
DA-D6	...for ***dominant*** common cause events...	....for significant common cause basic events....	
DA-D7	Cat I, II and III: (a) ...where ***significant*** generic parameter estimates are available.... Cat II: ....as it becomes available for ***dominant*** contributors...	Cat I and II: (a) delete the term “significant” Cat II: change “dominant contributors” to “significant basic events”	
DA-E1	(f) ***key*** assumptions made	Leave as is	
IF-C5	(c) an area with no ***significant*** flood sources.... (d) an area with mitigation systems.... capable of preventing unacceptable flood levels and other flooding effects are expected to be in***significant***.	(c) Delete the word “significant” (d) delete “and other flooding effects are expected to be insignificant”; add “flooding” before “mitigation” reworded: an area with flooding mitigation systems.... capable of preventing unacceptable flood levels.	(c) not needed, the parenthetical provides explanation (d) redundant with (c)
IF-D4	Cat I: ....the relative risk ***significance*** of modeled SSCs	Delete the term “risk”	fits the definition provided for significant basic events
IF-F2	(j) ...from ***importance*** measure calculation	leave as is	proper use of term
4.5.8.1	(b) ***important*** contributors to CDF...in terms of initiating events, accident sequences, equipment failures and operator errors.	Significant contributors to CDF...in terms of ...sequences and basic events (equipment unavailabilities and human failure events)	
4.5.8.1	(c) ***significant*** dependencies are accounted for	Delete the term “significant”	insignificant dependencies can be accounted for by non-inclusion
Tbl 4.5.8-1 HLR-QU-D	.....***important*** contributors to CDF, such as initiating events, accident sequences, equipment failures and operator errors, shall be identified.+	....significant contributors to CDF, such as initiating events, accident sequences, basic events (equipment unavailabilities and human failure events) shall be identified....	
Tbl 4.5.8-1 HLR-QU-E	...Sources of model and ***key*** assumptions shall be identified...	Key sources of model uncertainty and key assumptions (those that have the potential to impact the risk significant sequences) shall be identified	
QU-A2	Cat I, II and III: ....PROVIDE estimates of the individual sequences in a manner consistent with the estimation of total CDF to identify ***dominant*** sequences and confirm the sequence logic is appropriately reflected. The estimates may be accompanied by using.... split fractions.	Cat I, II and III: ....PROVIDE estimates of the individual sequences in a manner consistent with the estimation of total CDF to identify significant sequences. The estimates may be accompanied by using.... split fractions.	“confirm sequence logic” redundant with QU-D1

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
QU-B2	...that ***significant*** dependencies are not eliminated.	eliminate the SR	covered by QU-B3
QU-B3	...avoid discarding ***important*** cutsets and sequences.... ...the overall model results are not ***significant***ly changed... ...no ***important*** accident sequences are inadvertently eliminated.	...avoid discarding significant cutsets and sequences.... ....the overall model results converge and that no significant accident sequences are inadvertently eliminated	
QU-B5	....AVOID introducing ***significant*** conservatisms or non-conservatisms	change “significant” to “unnecessary”	
QU-B9	(c) ....within modules (e.g., risk ***significance***).	leave as is	not clear, but ok
QU-C3	TRANSFER the ***important*** sequence characteristics between event trees, not just the sequence frequency....	When linking event trees, TRANSFER the sequence characteristics (e.g., failed equipment) that could impact the logic or quantification of the subsequent accident development....	
Tbl 4.5.8-2(d)	....***important*** contributors to CDF, such as initiating events, accident sequences, equipment failures and operator errors, shall be identified....	....significant contributors to CDF, such as initiating events, accident sequences, basic events (equipment unavailabilities and human failure events) shall be identified....	
QU-D1	REVIEW the ***dominant*** cutsets or sequences to determine that the logic of the cutset or sequence is reasonable and to identify that there are no anomalies in the results....	REVIEW a sample of the significant cutsets and sequences relative to CDF and LERF and REVIEW the significant cutsets and relative to the significant sequences, sufficient to determine that the logic of the cutset or sequence is reasonable and to identify that there are no anomalies in the results....	
QU-D3	Cat III: REVIEW ***significant*** differences	IDENTIFY causes for differences	
QU-D4	REVIEW asa sampling of non-***dominant*** accident cutsets or sequences....	replace “non-dominant” with “non-significant”	
QU-D5	– IDENTIFY ***important*** contributors to CDF.... – ....an acceptable approach is the use of ***importance*** measures – REVIEW the ***importance*** values...	– replace “important” with “significant” – leave as is – leave as is	
Tbl 4.5.8-2(e)	...Sources of model and ***key*** assumptions...	Key sources of model uncertainty and key assumptions (those that have the potential to impact the risk significant sequences) shall be identified	

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
QU-E2	IDENTIFY ***key*** source of model uncertainty...	Leave as is	"key" defined in Section 2
QU-E3	Cat II: ....associated with ***key*** model uncertainties.	Leave as is	"key" defined in Section 2
QU-E4	Cat I: ...impact of the ***key*** model uncertainties... Cat II and III: EVALUATE....***key*** assumptions....EXAMINE ***key*** assumptions....	Leave as is	"key" defined in Section 2
QU-F1	(g) ...***key*** factors in causing the accidents to be non-***dominant*** (j) ***importance*** measure results (l) ....assessment of the ***significance*** of ***important*** assumptions	(g) ...factors in causing the accident sequences to be non-significant." (l) ....assessment of their risk significance	surperflous
QU-F2	Cat I, II and III: ...***key*** contributors to CDF.... Cat II and III: ... detailed description of ***dominant*** accident sequences....	Cat I, II and III: ...significant contributors (expressed in terms of initiating events, accident sequences, basic events) to CDF.... Cat II and III: ... detailed description of significant accident sequences....	
QU-F3	Cat I, II and III: ....***important*** assumptions	Cat I, II and III: replace "important" with "key"	
4.5.9-1	(b) ***significant*** operator actions.....	delete term "significant"	not needed, significant defined later in the sentence
Tbl 4.5.9-1 HLR-LE-B	LERF evaluations shall include an analysis of the credible severe accident phenomena.	The accident progression analysis shall include an evaluation of the credible contributors to a large early release.	HLR, as stated, is too high level.
Tbl 4.5.9-1 HLR-LE-C	LERF evaluations shall include an analysis of containment system performance	The accident progression analysis shall include identification of those sequences that would result in a large early release.	1. HLR, as stated, is too high level. 2. Containment "system" analysis is misleading

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
Tbl 4.5.9-1 HLR-LE-D	LERF evaluations shall include an analysis of containment structural capability.	The accident progression analysis shall include an evaluation of the containment structural capability for those containment challenges that would result in a large early release.	3. HLR, as stated, is too high level.
Tbl 4.5.9-1 HLR-LE-F	LERF shall be quantified in a manner that captures factors ***important*** to risk and supports an understanding of the sources of uncertainty.	The quantification results shall be reviewed and significant contributors to LERF, such as plant damage states, containment challenges and failure modes, shall be identified. Sources of uncertainty shall be identified and understood.	HLR, as stated, appears to be redundant with HLR-LE-E; proposed resolution better supports the associated SRs.
Tbl 4.5.9-2(b)	LERF evaluations shall include an analysis of the credible severe accident phenomena	The accident progression analysis shall include an evaluation of the credible contributors to a large early release.	Consistent with 4.5.9-1 HLR-LE-B
LE-B1	Cat I: INCLUDE potential severe accident phenomena that are ***important*** LERF contributors from the set identified in Tbl 4.5.9-2(a). An acceptable approach for identifying severe accident phenomena that could influence failure modes of various containment types is outlined.... Cat II: in Tbl 4.5.9-2(a) Cat III: INCLUDE all applicable postulated failure modes. Consider those.....	Cat I: IDENTIFY potential significant LERF contributors from the set identified in Tbl 4.5.9-3. An acceptable approach for identifying severe accident phenomena that could influence LERF for the various containment types is contained in NUREG/CR-6595..... Cat II: IDENTIFY potential credible LERF contributors, from the set identified in Tbl 4.5.9-3, sufficient to support development of realistic significant accident progression sequences. Cat III: INCLUDE the credible LERF contributors sufficient to support development of realistic accident progression sequences. Consider those contributors identified by IDCOR [Note (2)] and NUREG-1150 [Note 3)]. Known plant-specific contributors not included in the preceding evaluations, should also be included.	4. incorrect Tbl reference 5. incorrect use of terms

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
LE-B2	Cat I: USE containment loads (e.g., temperature, pressure) that are conservative for ***significant*** challenges to containment. An acceptable alternative is the approach in NUREG/CR-6595[Note (1)]. Cat II: USE containment loads (e.g., temperature, pressure) that are realistic for ***significant*** challenges to containment. Conservative treatment is used for non-***dominant*** LERF contributors.	Cat I: DETERMINE the containment challenges (e.g., pressure loads, debris impingement) resulting from contributors identified in LE-B1 in a conservative (generic or plant-specific analyses) manner. An acceptable approach is the approach in NUREG/CR-6595 [Note (1)]. Cat II: DETERMINE the containment challenges (e.g., pressure loads, debris impingement) resulting from contributors identified in LE-B1 in a realistic manner. Conservative treatment is used for non-risk significant LERF phenomena. Cat III: DETERMINE the containment challenges (e.g., pressure loads, debris impingement) resulting from contributors identified in LE-B1in a realistic manner.	More precise language for this part of analysis
LE-B3		delete the entire SR	redundant with LE-B2; does not seem to add anything
Tbl 4.5.9-2(c)	LERF evaluations shall include an analysis of containment system performance.	The accident progression analysis shall include identification of those sequences that would result in a large early release.	Consistent with 4.5.9-1 HLR-LE-C
LE-C1	Cat I, II and III: ...to propagate plant damage states in order to identify LERF scenarios in a manner consistent with the containment challenges and failure modes and intended level of detail.	Cat I, II and III: ....to propagate plant damage states to identify the accident progression sequences resulting in a large early release. The accident sequences are developed to a level of detail to account for the potential contributors identified in LE-B1 and analyzed in LE-B2.	Term “scenario” ambiguous

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
LE-C3	<u>Cat I</u>: INCLUDE those branch points necessary to provide a conservative LERF estimation. Containment event trees.... <u>Cat II</u>: INCLUDE those branch points necessary to provide a realistic LERF estimation. It is acceptable to selectively include mitigating actions by operating staff, effect of fission product scrubbing on radionuclide release, and expected beneficial failures. PROVIDE technical justification (by plant-specific or applicable generic calculations demonstrating the feasibility of the actions, scrubbing mechanisms, or beneficial failures) supporting.... <u>Cat III</u>: INCLUDE those branch points necessary to provide a realistic LERF calculation. INCLUDE risk ***<u>significant</u>*** mitigating actions by operating staff, effect of fission product scrubbing on radionuclide release, and expected beneficial failures. PROVIDE technical justification (by plant-specific or applicable generic calculations demonstrating the feasibility of the actions, scrubbing mechanisms, or beneficial failures) supporting....	<u>Cat I</u>: INCLUDE those branch points necessary to provide a conservative estimation of the accident progression sequences resulting in a large early release. Containment event trees.... <u>Cat II</u>: INCLUDE those branch points necessary to provide a realistic estimation of the significant accident progression sequences resulting in a large early release. INCLUDE significant mitigating actions by operating staff, effect of fission product scrubbing on radionuclide release, and expected beneficial failures. PROVIDE technical justification (by plant-specific or applicable generic calculations demonstrating the feasibility of the actions, scrubbing mechanisms, or beneficial failures) supporting.... <u>Cat III</u>: INCLUDE those branch points necessary to provide a realistic estimation of the accident progression sequences resulting in a large early release. INCLUDE mitigating actions by operating staff, effect of fission product scrubbing on radionuclide release, and expected beneficial failures. PROVIDE technical justification (by plant-specific or applicable generic calculations demonstrating the feasibility of the actions, scrubbing mechanisms, or beneficial failures) supporting....	More precise language for htis part of analysis; i.e., “accident progression” instead of “LERF”
LE-C4	<u>Cat II</u>: USE realistic system success criteria. Conservative system success criteria is used for non-***<u>dominant</u>*** LERF contributors.	<u>Cat II</u>: Use realistic system success criteria for the significant accident progression sequences. Conservative system success criteria is used for non-risk significant accident progression sequences.	
LE-C7	INCLUDE accident sequence dependencies in LERF event trees consistent with....	INCLUDE accident sequence dependencies in the accident progression sequences consistent with....	More precise language for this part of analysis
LE-C8	<u>Cat II</u>: ...in a realistic manner. Conservative treatment is used for non-***<u>dominant</u>*** LERF contributors.	<u>Cat II</u>: ...in a realistic manner for non-risk significant accident progression sequences resulting in a large early release. Conservative treatment is used for non-risk significant accident progression sequences.	

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
LE-C9	Cat II: ...in a realistic manner. Conservative treatment is used for non-***dominant*** LERF contributors.	Cat II: ...in a realistic manner for non-risk significant accident progression sequences resulting in a large early release. Conservative treatment is used for non-risk significant accident progression sequences.	
Tbl 4.5.9-2(d)	LERF evaluations shall include an analysis of containment structural capability	The accident progression analysis shall include an evaluation of the containment structural capability for those containment challenges that would result in a large early release.	Consistent with 4.5.9-1 HLR-LE-D
LE-D1	Cat I: DETERMINE the containment ultimate capacity for the ***dominant*** challenges that result in LERF. USE a conservative evaluation of containment capacity for ***dominant*** containment failure modes. .....and INCLUDE as potential failure modes, as required.... Cat II: DETERMINE the containment ultimate capacity for the ***dominant*** challenges that result in LERF. PERFORM a realistic containment capacity analysis for ***dominant*** containment failure modes. USE a conservative evaluation of containment capacity for non-***dominant*** containment failure modes.....and INCLUDE as potential failure modes, as required.... Cat III: DETERMINE the containment ultimate capacity for the ***dominant*** challenges that result in LERF. PERFORM a realistic containment capacity analysis for ***dominant*** containment failure modes by using plant-specific input.....	Cat I: DETERMINE the containment ultimate capacity for the containment challenges that result in a large early release. PERFORM a conservative containment capacity analysis for the significant containment challenges. .....and INCLUDE as potential containment challenges, as required.... Cat II: DETERMINE the containment ultimate capacity for the containment challenges that result in a large early release. PERFORM a realistic containment capacity analysis for the significant containment challenges. USE conservative parameters for the non-risk significant containment challenges. .....and INCLUDE as potential containment challenges, as required.... Cat III: DETERMINE the containment ultimate capacity for the containment challenges that result in a large early release. PERFORM a realistic containment capacity analysis for the t containment challenges by using plant-specific input....	
LE-D2	Cat I: When failure location [Note (2)] affects the event classification as a LERF, DEFINE failure location based on a conservative plant-specific containment assessment. JUSTIFY.... Cat II and III: When failure location [Note (2)] affects the event classification as a LERF, DEFINE failure location based upon a realistic plant-specific containment assessment.	Cat I: When containment failure location [Note (2)] affects the classification of the accident progression as a large early release, DEFINE failure location based on a conservative plant-specific containment assessment. JUSTIFY... Cat II and III: When containment failure location [Note (2)] affects the classification of the accident progression as a large early release, DEFINE failure location based on a realistic plant-specificcontainment assessment.	More precise language

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
LE-D3	Cat I: USE a conservative evaluation of interfacing system failure probability for failure modes. If generic analyses.... Cat II: PERFORM a realistic interfacing system failure probability analysis. Evaluation ...may include conservatisms. USE a conservative evaluation of interfacing system failure probability for non-***dominant*** failure modes. INCLUDE.... Cat III: PERFORM a realistic interfacing system failure probability analysis for the failure modes. USE plant-specific input. INCLUDE.....	Cat I: USE a conservative evaluation of interfacing system failure probability for significant accident progression sequences resulting in a large early release. If generic analyses.... Cat II: PERFORM a realistic interfacing system failure probability analysis for the significant accident progression sequences resulting in a large early release. Evaluation....may include conservatisms. USE a conservative evaluation of interfacing system failure probability for non-risk significant accident progression sequences resulting in a large early release. INCLUDE..... Cat III: PERFORM a realistic interfacing system failure probability analysis for the accident progression sequences resulting in a large early release. USE plant-specific input. INCLUDE.....	
LE-D4	Cat I: USE a conservative evaluation of secondary side isolation capability for ***dominant*** SG tube failure modes. If generic analyses.... Cat II: PERFORM a realistic secondary side isolation capability analysis for ***dominant*** SG tube failure modes. Evaluation.... may include conservatisms. USE a conservative evaluation of secondary side isolation capability for non-***dominant*** SG tube failure modes.... JUSTIFY....	Cat I: USE a conservative evaluation of secondary side isolation capability for significant accident progression sequences resulting in a large early release. If generic analyses.... Cat II: PERFORM a realistic secondary side isolation capability analysis for the significant accident progression sequences resulting in a large early release. Evaluation.... may include conservatisms. USE a conservative evaluation of secondary side isolation capability for non-risk significant accident progression sequences resulting in a large early release.	
LE-D6	Cat II: TREAT containment isolation in a realistic manner for ***dominant*** contributors. Conservative treatment is used for non-***dominant*** contributors. INCLUDE....	Cat II: TREAT containment isolation in a realistic manner for the significant accident progression sequences resulting in a large early release. Conservative treatment is used for the non-risk significant accident progression sequences resulting in a large early release. INCLUDE....	

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
Tbl 4.5.9-2(d) Note (2)	Containment failures below ground level may not be LERF even	Containment failures below ground level may not be a large early release even	More precise language
LE-E2	Cat II: USE realistic parameter estimates for ***dominant*** LERF sequences. Conservative parameter estimates are used for non-***dominant*** LERF sequences.	Cat II: USE realistic parameter estimates for significant accident progression sequences resulting in a large early release. USE conservative estimates for non-risk significant accident progression sequences resulting in a large early release.	
Tbl 4.5.9-2(f)	LERF shall be quantified in a manner that captures factors ***important*** to risk and supports an understanding of sources of uncertainty	The quantification results shall be reviewed and significant contributors to LERF, such as plant damage states, containment challenges and failure modes, shall be identified. Sources of uncertainty shall be identified and understood.	Consistent with 4.5.9-1 HLR-LE-F
LE-F1	Cat I: LIST the ***dominant*** contributors to LERF... REVIEW for reasonableness. Cat II and III: PERFORM an ***importance*** analysis to identify the ***dominant*** contributors to LERF.	Cat I: IDENTIFY the significant contributors to large early release (e.g., plant damage states, containment failure modes, containment system unavailabilities). REVIEW for reasonableness. Cat II and III: PERFORM an importance analysis to identify the significant contributors to LERF.	
LE-F2	Cat I: ...***key*** sources of uncertainty.... Cat II and III: ....the ***key*** sources of uncertainty and includes sensitivity studies for ***dominant*** contributors to LERF.	Cat I: leave as is Cat II and III: ....the key sources of uncertainty and includes sensitivity studies for the significant contributors to LERF.	
LE-G2	DOCUMENT the potential LERF contributors considered, where appropriate, including....	DOCUMENT the containment failure modes, phenomena, equipment failures and human actions considered in the development of the accident progression sequences, where appropriate, including....	More precise language
LE-G3	DOCUMENT treatment of ***key*** factors influencing containment capability,.... (a) design details (i.e., heat sink distribution...	DOCUMENT treatment of factors influencing containment challenges and containment capability... (a) design details (e.g., heat sink distribution....	
LE-G5	(b) ***important*** assumptions (d) ...that are the ***key*** factors	(b) assumptions that affect the results (d) ....that are significant basic events	

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
LE-G6	Cat I: DESCRIBE the ***key*** contributors to LERF Cat II and III: DESCRIBE the ***key*** contributors to LERF. PROVIDE a detailed description of ***dominant*** plant damage states and accident progression sequences.	Cat I: DESCRIBE the significant contributors to LERF Cat II and III: PROVIDE a detailed description of the significant contributors (i.e., plant damage states, accident progression sequences, phenomena, containment challenges, containment failure modes).	
LE-G7	DOCUMENT sources of uncertainty	DOCUMENT sources of uncertainty consistent with QU-F3	Adds clarity, too high level
Tbl 4.5.9-3	Title: Potential LERF Contributors to be Considered	Retitle: Containment Failure Modes, Phenomena, Equipment Failures, Human Actions to be Considered in Accident Progression Sequences Potentially Resulting in Large Early Release Rename Column: Potential LERF Considerations Classify and Reorder: Containment failure modes — Containment isolation failure Containment bypass Shell melt-through ATWS-induced failure Phenomena — Energetic containment failures Steam explosions Hydrodynamic loads under ... Equipment failure — Suppression pool bypass Isolation condenser tube rupture Vacuum breaker failure Human action — RPV and/or containment venting Containment flooding In-vessel recovery Correct: For BWR Mark III the “x” for (c) de-inerted operation is incorrect, and the “x” should be for (b) hydrogen combustion	adds clarity, more precise title items grouped into consistent categories, adds clarity rectify incorrect entry, Mark III’s unlike the I and II are always de-inerted and subject to H2 combustion
5.4	....Changes that would impact risk-informed decisions should be prioritized to ensure that the most ***significant*** changes are incorporated....	.......Changes that would impact risk-informed decisions should be incorporated as soon as practical.”	What is significant is dependent on the application
6.3.3	(i) the containment response calculations, performed specifically for the PRA, for the ***dominant*** plant damage states	move to 6.3.9.2 Change “dominant” to “significant”	in wrong place, this is a Level 2 requirement

Index No.	ASME Standard (including staff position in Appendix A)	Resolution	Basis
6.3.4	The portion of selected system models selected for review typically includes (a) ***<u>dominant</u>*** systems contributing to the CDF or LERF calculated in the PRA (b) different models reflecting different levels of detail (c) front-line.....	The portion of selected system models selected for review typically includes a sample of the systems whose failure contributes to the significant sequences (CDF or LERF), including: (a) different models reflecting different levels of detail (b) front-line.....	
6.3.5	The portion of the HRA selected for review typically includes (a) HEPs for ***<u>dominant</u>*** human actions contributing to the CDF or LERF calculated in the PRA (b) the selection and implementation of any screening HEPs.....	The portion of the HRA selected for review typically includes a sample of the human failure events whose occurrence contributes to the significant sequences (CDF or LERF), including: (a) the selection and implementation of any screening HEPs.....	
6.3.7	The portion of the internal flooding analysis selected for review typically includes (a) ***<u>dominant</u>*** internal contributors to the CDF or LERF calculated in the PRA (b) the screening of any flood areas (c) internal flood initiating event frequencies....	The portion of the internal flooding analysis selected for review typically includes a sample of the screening of flood areas and the flooding sequence contributing to the significant sequences (CDF or LERF), including: (a) internal flood initiating event frequencies....	
6.3.9.2		<u>Add</u>: (i) the containment response calculations, performed specifically for the PRA, for the dominant plant damage states	moved from 6.3.3