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October 28, 2021

Ms. Louise Lund, NRC Standards Executive
Office of Nuclear Regulatory Research
Nuclear Regulatory Commission
11555 Rockville Pike
Mail Stop 2WFN-08A60M
Rockville, MD 20852-2739

Dear Ms. Lund,

The purpose of this letter is to provide feedback from the Joint Committee on Nuclear Risk Management (JCNRM) to the U.S. Nuclear Regulatory Commission (NRC) on the recently released pre-decisional trial use Regulatory Guide 1.247, *Acceptability of Probabilistic Risk Assessment Results for Advanced Non-Light Water Reactor Risk-Informed Activities*, which endorses the American Society of Mechanical Engineers (ASME) American Nuclear Society (ANS) *Probabilistic Risk Assessment Standard for Advanced Non-Light Water Reactor Nuclear Power Plants RA-S-1.4-2021*[1]. The undersigned are the co-chairs of the JCNRM, the ANS-ASME standards consensus committee that develops and maintains standards for probabilistic risk assessment (PRA).

The NRC endorsement of the Non-Light Water Reactor (NLWR) standard is a vital step for supporting the growing advanced reactor industry in the U.S. and assisting recent efforts to develop a risk-informed performance-based advanced reactor licensing framework. The JCNRM is appreciative of the time and resources invested by the NRC, as members of the JCNRM and working groups, commenters on JCNRM ballots, and as part of staff reviews for endorsement of the NLWR standard. The detailed evaluations conducted by the NRC staff provide valuable insights that improve the quality of the standard.

Following the release of the pre-decisional trial use RG 1.247 by the NRC, the document was reviewed by JCNRM and subcommittee members. Feedback from its members was solicited by the NLWR standard working group and is summarized in the current document. A brief history of the standard is provided here, followed by a description of overarching feedback topics related to the trial use RG 1.247. Detailed comments regarding specific regulatory positions are contained in the Attachment to this letter.

[1] Referenced as the “NLWR standard” in the current document.

Non-Light Water Reactor Standard History

Development of the NLWR standard began in 2006, before the ASME and ANS PRA standards organizations were combined to form the JCNRM. There was initial hesitation to develop the standard due to concerns regarding lack of NLWR PRA experience to justify a standard. To address these concerns, a trial use process was adopted (a first for the JCNRM), which would allow issuing of a trial use standard that could be piloted by users. The trial use version of the NLWR standard was released in 2013 with a considerable number of advanced reactor vendors, representing the spectrum of advanced reactor designs, piloting the standard. Based on the significant experience gained through the trial use process and feedback from pilot users, a new version of the NLWR standard was developed. This version of the standard was also modified to maintain alignment with the Next Edition of the Level 1 Light Water Reactor (LWR) PRA standard and associated LWR standards under development (Level 2 and Level 3).

The new NLWR standard underwent a JCNRM ballot in March 2020, with a total of 1,319 comments received, including 489 from the NRC staff. While the number of approval votes fell just short of the amount required for passage, none of the comments required major revisions to the standard, although all comments were dispositioned per ASME/ANS/ANSI rules. A revised version of the NLWR standard underwent a second JCNRM ballot and received unanimous approval from its members. An additional 86 comments were received, with 70 comments from the NRC staff, which were dispositioned or postponed to a future revision. The NLWR standard subsequently received ANSI approval and was formally published in February 2021. The approval and publication of the standard marks a major accomplishment in the development of a technology inclusive, integral PRA standard.

Pre-Decisional RG 1.247 Feedback

The NRC staff review of the NLWR standard provides affirmation of the quality of the standard, as the commentary and clarifications in RG 1.247 do not indicate any significant gaps or concerns. Only 147 staff positions are provided (33 qualifications and 114 clarifications) regarding a standard with 247 high level requirements (HLRs) and 1,233 supporting requirements (SRs). In addition, most of the staff positions are associated with SRs that are common to the JCNRM LWR PRA standards. The JCNRM is pleased that the PRA technical elements that are generally unique to NLWRs, such as Initiating Event Analysis, Event Sequence Analysis, Event Sequence Quantification, Mechanistic Source Term, and Risk Integration have minimal clarifications.

The following list provides an overview of major areas of the JCNRM feedback regarding trial use of RG 1.247. Further details on these topics and other specific regulatory positions is documented in the Attachment.

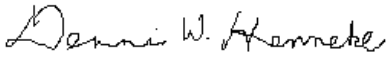
- **Motivation for Regulatory Positions**: Additional insight regarding the motivation for particular regulatory positions would be useful to assist the JCNRM in planning future standard development activities.
- **PRA Application, Scope, and Methods**: Given the broad applicability of RG 1.247 to support all non-LWR risk-informed applications under Part 50, Part 52, and likely, the future Part 53, regulatory positions regarding PRA scope and the specification of methods or analytical approaches would be better placed within application-specific

guidance. Such an approach would be consistent with current JCNRM standards development guidance and the NLWR standard application process.

- **Areas of Improvement**: The NRC noted several areas where the NLWR standard could be improved. Such changes should be submitted to the JCNRM for further review.

Sincerely,

C. Rick Grantom P.E.
ASME Co-Chair, JCNRM



Dennis Henneke
ANS Co-Chair, JCNRM

Oliver Martinez
ASME Secretary, JCNRM

CC: P. Schroeder, D. Eggett

Attachment:
Detailed Comments on RG 1.247 Regulatory Positions

The following document provides detailed feedback from JCNRM and subcommittee members based on a *preliminary* review of pre-decisional trial use RG 1.247. A discussion of major topical areas is provided first, followed by comments regarding specific clarifications in Table 1.

Motivation for Regulatory Position

The majority of NRC clarifications in RG 1.247 are associated with requirements common to JCNRM LWR PRA standards. As these standards (Level 1, Level 2, and Level 3) are being developed in parallel, it is important to understand the motivation for the NRC regulatory positions. For example, the NRC noted that certain regulatory positions are necessary for consistency with RG 1.200 Rev 3, while others are to address unique characteristics associated with NLWRs. Given that the LWR PRA standards are likely to also undergo NRC review in the near future, additional information regarding the regulatory positions would assist the JCNRM in addressing these topics before formal NRC review.

PRA Technical Adequacy

In the *Background* section of RG 1.247, it states that "PRA acceptability" is synonymous with terms such as "PRA quality" and "PRA technical adequacy." Furthermore, RG 1.247 asserts that the staff uses the term "PRA acceptability" with respect to the scope, level of detail, conformance with PRA elements (i.e., technical adequacy), and plant representation of a PRA as related to the outcome of the NRC staff's review of a given application. This terminology is based on DPO-2016-001.

It is important to highlight that this terminology is generally in conflict with that of the NLWR standard. The technical requirements presented in Section 4 of the NLWR standard "determine the technical adequacy of a PRA for different sources of radioactive material, plant operating states, hazard groups, and risk metrics to support applications." However, while satisfaction of the technical requirements can demonstrate technical adequacy of the PRA, it does not denote acceptability of the PRA for a specific application, such as approval by a regulatory body. In the case of reactor licensing through the NRC, or other NRC risk-informed activities, acceptability of the PRA is determined by the NRC. This distinction is important when considering the application process, discussed next.

Risk Assessment Application Process and PRA Scope

Section 3 of the NLWR standard outlines the risk assessment application process, which establishes the capability of a PRA to support a particular risk-informed application. This process characterizes aspects of the PRA, such as the design life cycle stage, site characteristics, PRA scope, level of detail, etc., and identifies the standard requirements sufficient to support

the application. If the PRA meets the SRs specified for the application, the PRA is adequate for the application being considered.

As the NLWR standard may be utilized to support a multitude of risk-informed applications, including design and licensing both domestically and internationally, it is important that the requirements within the standard do not dictate the scope of analyses or other related characteristics. Instead, the application process identifies the PRA technical elements and SRs that support the necessary scope, level of detail, and risk metrics necessary for the application.

As will be detailed in subsequent sections of this attachment, in RG 1.247 certain NRC regulatory positions concerning SRs in the NLWR standard extend into the area of application, scope, and approved methodologies. While it is appropriate for the NRC to specify the PRA requirements associated with specific risk-informed regulatory applications, such information should be provided within the guidance documents concerning the particular application. As stated in RG 1.247 and highlighted during a recent presentation to the ACRS, the RG is applicable to all non-LWR risk-informed licensing applications under both 10 CFR Part 50 and 52 (with the intent to also support Part 53, once released). This includes design, construction, and operational regulatory activities. The requirements, or lack thereof, regarding the PRA differ depending on the selected licensing avenue and purpose.

The inclusion of SR clarifications regarding PRA scope within RG 1.247 can result in the unintentional expansion of standard requirements beyond that appropriate for a particular application and is inconsistent with development principles of the standard. The designation of PRA scope criteria within the guidance for specific applications would be consistent with the NLWR standard application process and prevent potential confusion.

Performance-Based Nature of the Standard

The NLWR standard (and other JCNRM standards) contain SRs that outline what is necessary to meet HLRs for each PRA technical element. This is a performance-based approach that does not, to the extent possible, dictate how to meet the SRs. While it is appropriate for the NRC to specify the methodologies or analysis approaches for satisfying standard SRs, such information should be contained within application-specific guidance.

Regulatory Positions

The following list provides summary feedback regarding the regulatory positions provided in Section C and Appendix A of pre-decisional RG 1.247. Additional detailed commentary on specific clarifications is provided in Table 1.

- **C.1.1**:
    - RG 1.247 states that a PRA and its results used to support an application should generally address all radiological sources, all internal and external hazards, and

all plant operating states (POSs). As outlined above, such statements dictate the scope of the PRA and would be more appropriate within guidance regarding specific risk-informed applications. Such an approach would also be consistent with the NLWR standard application process and RG 1.200, where additional application-specific guidance regarding PRA scope is provided in associated RGs (RG 1.201, 1.205, etc.).

- This regulatory position discusses the utilization of CDF/LRF as potential risk surrogates. While the NLWR standard supports the use of intermediate risk metrics, if justified, the standard requirements (such as those in the Risk Integration technical element) utilize frequency and radiological consequence directly and do not accommodate risk surrogates.

- **C.1.3**:
  - Table 1 of RG 1.247 summarizes the PRA technical elements. However, this overview is inconsistent with the NLWR standard, as many of the technical elements listed under "internal events" are also applicable to hazards. Table 1.4-1 of the NLWR standard should be utilized directly to avoid confusion.
  - Sections C.1.3.1 through C.1.3.19 provide an overview of the technical elements in the NLWR standard and associated objectives. However, in many cases, the paraphrasing of the standard neglects key information or mischaracterizes the intent. The technical element objectives in the NLWR standard were carefully worded and subject to multiple reviews/ballots. Therefore, the NLWR standard objective wording should be utilized directly, as to not create potential conflict or inconsistencies between the NLWR standard and RG 1.247. If there are differences between the NLWR standard wording and NRC intent, then this information should be provided with further clarification regarding the motivation for the change.
  - Section C1.3.18 of RG 1.247 states that "unless justified, relative risk significance criteria … should be used to develop the PRA." The NLWR standard supports both relative and absolute risk significance criteria and does not require *additional* justification for the use of absolute risk. This is an area where RG 1.247 dictates a PRA characteristic, which would be better placed in application-specific guidance, if it is the NRC's intent to require such justification for absolute risk significance criteria.

- **Appendix A**:
  - The staff highlighted several areas where the NLWR standard could be improved. Such changes should be submitted to the JCNRM for review and consideration to ensure the standard SRs are consistent and adhere to standards development guidance. If the change is accepted, it will be incorporated into a revised version of the standard.

- RG 1.247 provides a qualification to add errors of commission to the human reliability technical element. Such an addition is beyond the current PRA state-of-practice for Human Reliability Analysis and is not required by any PRA standard including the existing LWR standard endorsed by RG 1.200.
- RG 1.247 does not require adherence to standard SRs regarding reporting requirements on events of very low frequency or consequence. The inclusion of these SRs in the standard is purposeful, as they are fundamental to recognizing the limitations of PRA technology.
- As highlighted above, RG 1.247 includes a number of clarifications that result in the revised SR wording specifying "how to" perform an analysis. Such statements conflict with JCNRM standard development guidance, and should be removed from Appendix A. For example, the clarifications include additional wording on performing feasibility evaluations for human errors, and setting any non-feasible actions to 1.0 in the PRA model. Removal of such statements, or transfer to application-specific guidance, is recommended.
- RG 1.247 includes clarifications that redefine well-established terms, such as the clarification to "plant operating state" to include changes in "barriers," "propagation pathways" and "modification of fragilities." Any changes in terms should go through the consensus process of the JCNRM, as the changes affect all JCNRM standards.

Table 1: Detailed Comments Regarding Regulatory Positions in RG 1.247

Index No.	NRC Resolution	JCNRM Comment
C.1.3.10		There is a statement in Section C.1.3.10 on page 32 that the „...objectives of a seismic hazard analysis element are as follows: The frequency of earthquakes at the site is established“. This is incorrect. Seismic hazard analysis determines frequency of ground motion levels at a site. The frequency of earthquakes on a particular fault or in a seismic zone is part of the source characterization, but is not at the site.
Section 2.2 – Feasibility	Add the following definitions: **(1) Feasibility assessment – the qualitative consideration of whether the operator action is go/no-go, considering several performance shaping factors.** **(2) Feasible – an operator action that can be credited in a PRA model if the action has met all the feasibility assessment criteria (see supporting requirement HR- H2)**	The definitions provided in the clarification have limited applicability. For example, feasibility is also used in the Data Analysis (DA) element. The comments below also disagree with the addition of a separate “feasibility assessment” in the SRs, as this is too much “how to” guidance in the SRs. Additionally, current HRA determines by acceptable methods whether an action is possible and the resulting human error probability. For example, NUREG/CR-1278 and NUREG-1880 do not have a feasibility assessment but do have guidance on determining the probability of the HEP based on similar criteria. As such, the addition of a non-standard assessment is not consistent with accepted methodology, in addition to being too much “how to” guidance.
Section 2.2 – Skill of the Craft	The following definition of “skill of the craft” should be used: “**Actions that one can assume that trained staff would be able to perform without written procedures (e.g., simple tasks such as turning a switch or opening a manual valve as opposed to a series of sequential actions or set of actions that need to be coordinated.”**	Suggest to JCNRM for review.
POS-A1	CC-I ~~IDENTIFY a representative set of plant evolutions to be analyzed.~~ ~~INCLUDE, at a minimum, plant evolutions from at-power operations.~~ ~~See Note POS-N-1, POS-N-2, POS-N-3,~~	Clarification requires LPSD at all stages of the licensing process. This is in conflict with the discussion throughout the standard and the consensus wording of POS-A1. Clarification is centered on licensing application, and should not be included in the NLWR standard SRs or notes.

Index No.	NRC Resolution	JCNRM Comment
	~~POS-N-4~~ CC-I and CC-II **IDENTIFY a representative set of plant evolutions to be analyzed, including refueling outages, other controlled shutdowns, and forced outages.** **See Note POS-N-3**	
POS-A8	CC-I and CC-II For PRAs performed during the pre-operational stage, INTERVIEW knowledgeable engineering **and operations personnel** to confirm that the selection of ~~plant operating states~~ **POSs** correctly represents the as-designed, and as-intended- to-operated plant.	Clarification suggests POS review by operations personnel even for pre-operational PRA. Some PRA developers have design personnel with overall operations experience, but may not have operations personnel for the plant under design (especially if the design is a first-of-a-kind) available at earlier phases in the design process.
POS-A10	CC-I and CC-II REVIEW the plant conditions defined for each plant operating state to ENSURE that the plant operating state definition remains sufficient for those hazard groups to do the following: (a) support the selection of initiating events, the justification of success criteria, plant operating states frequency and duration parameters, the evaluations of HFEs, the accounting for planned equipment outages, and the quantification of event sequence frequencies; (b) provide a finite number of sets of plant conditions for peer reviews (**c) account for changing plant conditions that may impair or change the effectiveness of radionuclide transport barriers, affect propagation pathways, or modify fragilities of SSCs to ensure that appropriateness of the POS definition.**	This clarification conflicts with the definition of POS and extends into "how to." Changes such as this are addressed in the PRA model, not POS definition. The current definition of POS uses a long-standing definition of POS included in both the JCNRM standards and NRC reference documents such as NUREG-1150, NUREG/CR-6143 and others. Any change in the long-standing definition should be submitted to the JCNRM consensus committee for consideration. The clarification on POS-A10 is already covered by the "success criteria" part of POS-A10 (a).
HLR-HR-E	A systematic review of relevant available procedures, any past operational events, procedural guidance, and training shall be used to identify the set of post-initiator operator responses required for each of the event sequences, **as well as, the well-intended post-initiator operator responses that result in adverse safety**	When combined with changes to HR-E4, the change now requires additional analysis of errors of commission, which is not currently required by any PRA standard.

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	impacts.	
HR-D4	CC-II For each detailed HEP assessment, INCLUDE in the evaluation process the following plant- or design-specific relevant information when available: (b) the quality of the human-machine interface **(e.g., adherence to human factors guidelines [NUREG-0700, Revision 3] and results of any quantitative evaluations of performance per functional requirements), including ...**	Clarification extends to "how to" and reference to a specific document in the SR is not appropriate, as it indicates only one acceptable approach to meeting the SR. The clarification on HR-D4 may be appropriate for operating plants but not for plants in the design phase where procedures may not be fully developed. However, the wording added is too much "how to" as mentioned above.
HR-G1	CC-I **ASSESS the feasibility of the HFEs before assigning the final HEPs using the criteria in HR-H2. If the HFE is not feasible**, ASSIGN an HEP of 1.0 or DO NOT CREDIT the HFE in the PRA. For HFEs determined to be feasible, USE conservative estimates for the HEPs of the HFEs in the event sequences that survive initial quantification. CC-II **ASSESS the feasibility of the HFEs before assigning the final HEPs using the criteria in HR-H2. If the HFE is not feasible**, ASSIGN an HEP of 1.0 or DO NOT CREDIT the HFE in the PRA. For HFEs determined to be feasible, PERFORM detailed analyses for estimation of HEPs for risk-significant HFEs For the HEPs of HFEs that are not risk-significant, ENSURE the requirement for CC-I is met.	Clarification extends to "how to" and HRA techniques already include a feasibility step during the qualitative portion of the HRA (a similar change was rejected by the JCNRM for these reasons). The JCNRM disagreed with the addition of a separate "feasibility assessment" in the SRs, as this is too much "how to" guidance in the SRs. Additionally, current HRA determines by acceptable methods whether an action is possible and the resulting human error probability. For example, NUREG/CR-1278 and NUREG-1880 do not have a feasibility assessment but does have guidance on determining the probability of the HEP based on similar criteria. As such, the addition of a non-standard assessment is not consistent with accepted methodology, in addition to being too much "how to" guidance.
HR-G4	CC-II (d) degree of clarity of the cues/indications **in supporting the detection, diagnosis, decision-making, and action execution given the plant-specific and event scenario-specific context** **(p) communication among personnel in**	Clarification extends to "how to." Item (p) disagrees with RG-1200 clarifications. As such, the change indicates a potential change to the base LWR standard. The base standard was just approved with this item not submitted as a comment to the standard. Any potential change to the standard should first be submitted to the JCNRM for consensus consideration. In

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	the same team and in different teams.	this case, even if the change was accepted by JCNRM, it is likely the how to aspect of the wording (among personnel in the same team and in different teams) would be rejected.
HR-H2	Add the following two feasibility criteria: **(f) there is a sufficient plan for command and control;** **(g) there is a sufficient plan for communications.**	Clarification extends to "how to." See comments above on Feasibility.
DA-C20	...IDENTIFY instances of plant-specific experience ~~or~~ **and, when that is insufficient to estimate failure to repair consistent with DA-D10,** applicable industry experience and for each repair, COLLECT...	Clarification extends to "how to" and restricts flexibility that may be necessary for unique situations.
FLEV-C1	... (f) impact of POS changes within the scope of the PRA on flood-induced initiating events. **(g) impact of temporary alignments on the frequency of equipment failure-induced floods for each POS.** ...	This clarification would be the first mention of temporary alignments but falls under a documentation, not analysis, SR. Intent of clarification likely covered by maintenance induced flooding assessments under FLEV-B4. For item g – the FLEV SRs do not include discussion of temporary alignments. As such, this documentation SR potentially expands the scope of FLEV-A and B SRs though inference.
SHA-B5	Add the following to SHA-B5: **If an existing probabilistic SHA is used, DEMONSTRATE that an updated catalog of earthquakes does not make the existing probabilistic SHA unviable.**	The clarification on SHA-B5 is redundant, if there is an existing SHA it will need to be reviewed and updated to meet other SRs to support the PRA. If the updated catalog of earthquakes invalidates any of the old analysis, the SRs already documented in the standard (see SHA-B2, SHA-C4, SHA-C5 would not be met.
SHA-D3	ENSURE that uncertainties are included in the model such that the aggregate of predicted ground motions captures the range of ground motions that can occur at a site **as well as alternative magnitude and distance scaling in** accordance with the level of analysis identified for the SRs of HLR- SHA-A and the data and information identified in the SRs of HLR-SHA-B. ...	Clarification extends to "how to."

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SFR-C1	SPECIFY the basis for screening of inherently rugged components **justifying the applicability to the plant and site or range of sites identified in SHA-A1.**	SSC ruggedness is not dependent on the site and the requirement justifying applicability to the site should be removed.
SFR-D5	EVALUATE potential functional and structural failure mechanisms, equipment anchorage, and support load path., **and pathways necessary for performing required ex- control room actions.**	No other mentions of pathways in the standard. SFR-D involves the analysis of SSC fragilities, and this change expands the current requirements for this analysis. Additionally, since no other SRs discuss what to do with this expanded analysis, the results would go un-used in any other requirements. Seismic HRA looks at impact on pathways, and looks for multiple pathways along with other attributes – so specific fragility analysis along the entire pathway for each ex-control room action is unnecessary.
SFR-E3	CC-I ESTIMATE conservative seismic fragilities for the failure mechanisms of interest identified in Requirement SFR- E1 using plant-specific data, or JUSTIFY the use of generic fragility data (e.g., fragility test data, generic seismic qualification test data, and earthquake experience data) or conservative assumptions for the SSCs as being **applicable to the SSC** and appropriate for the plant or **applicable to the SSC and bounding for the range of sites identified in SHA-A1.** **…**	The seismic fragilities are not dependent on the site and the clarification requiring applicability to the site should be removed.
SFR-E4, E5	…	See comment for SFR-E3
HLR-SPR-B	The Seismic Plant Response Model shall include seismic- induced SSC failures, non- seismic-induced SSC failures, unavailabilities, human errors, POSs, sources of radioactive material, and multi-reactor effects that **represent the as-designed, or as-built, or as- operated or as-intended-to- operate and** can affect the frequencies of seismic-induced event sequence families modeled in the PRA.	The attributes of the overall standard is to have the PRA represent the as-designed, as-built, as-operated plant. It is not clear why this change is added here and not other locations and HLRs. As such, it is redundant to the overall requirements, and is not needed here. Additionally, the additional level of detail is inconsistent with other HLRs throughout the standard.
SPR-B6	Using a systematic process, INCLUDE in the system analysis the effects of those relays or similar devices whose contact chatter results in the unavailability or spurious actuation of SSCs that are **included in the seismic equipment list**	Expands analysis from risk-significant SSCs to all SSCs. The recent approval of the LWR standard includes wording that agrees with the NLWR, and was approved without NRC comment on this expansion or change.

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	developed to meet Requirement SPR-C1. ~~risk-significant contributors to frequencies of event sequence families modeled in the PRA.~~	There has been previous discussion with the NRC on the LWR related SR – where the NRC suggested you can't determine risk significance at this step of the analysis. However, the peer review against the standard is performed when the analysis is complete, so the list of risk-significance SSCs is available at the time of the peer review.
SPR-D5	CC-I and CC-II When addressing **feasibility**, influencing factors, ….	Feasibility aspect covered in other portions of the analysis. See other comments above on the requirement to perform a separate feasibility assessment.
SPR-E8	SATISFY Requirement ESQ- E1 with the additional assumptions identified by each seismic technical sub-element in Requirement SHA-F3, fragility analysis, Requirement SFR-**E6 and/or SFR-E7**, and system modeling, Requirement SPR-E6 **and/or SPR-E7**.	"And/or" terminology is inappropriate.
HS-A3	IDENTIFY site-, **plant-, or** ~~and~~ design-**specific** ~~unique~~ hazards and hazard groups, **as applicable to the stage of the plant lifecycle**, not already identified in Requirement HS-A2. See Notes HS-N3, HS-N-4, **HS-N-5.**	Hazards are not "applicable" to a design stage.
HS-B5	USE SCR-3 in Table 1.10-1 when **qualitatively** screening out a hazard or hazard group by showing that either:	Suggest to JCNRM for review.
WPR-D11	CC-I and CC-II When addressing **feasibility**, influencing factors, and the timing considerations in Requirements HR-G1, HR-G4, HR-G6, and HR-G8, INCLUDE the effect of high wind hazard on the control room and ex-control room human actions.	Feasibility aspect covered in other portions of the analysis. See other comments above on the requirement to perform a separate feasibility assessment.
XFPR-E6	CC-I When addressing **feasibility**, influencing factors, and the timing considerations in Requirements **HR-G1**, HR-G4, HR-G6, and HR-G8, INCLUDE the effect of external flooding hazard on the control room and ex- control room human actions. CC-II When addressing **feasibility**, influencing factors, and the timing considerations in Requirements **HR-G1**, HR-G4, HR-G6,	Feasibility aspect covered in other portions of the analysis. See other comments above on the requirement to perform a separate feasibility assessment.

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	and HR-G8, INCLUDE the effect of ~~flood impacts~~ **external flooding hazard** on the control room and ex-control room human actions.	
OPR-A4	INCLUDE in the plant response model the events identified by Requirements OPR-A1, OPR-A2, OPR-A3 above that ~~cause risk-significant event sequences and/or risk significant event progression sequences~~ **lead to radiological consequences.**	Suggest to JCNRM for review. The clarification on OPR-A4 is out of line with the requirements for all other hazards. There is no justification for a stricter requirement for other hazards vs all other external hazard.
OPR-C6	CC-I: **ASSESS the feasibility of the HFE using the criteria in HR-H2. If the HFE is not feasible, ASSIGN an HEP of 1.0 or DO NOT CREDIT the HFE in the PRA. For HFEs determined to be feasible,** USE screening values in accordance with Requirement OPR-C5 for the HEPs for HFEs included in the hazard PRA model. CC-II: Attention is to be given to how the hazard situation alters previous assessments in non-hazard analyses as to the **feasibility**, influencing factors, and the timing considerations in Requirements **HR-G1**, HR-G4, HR-G6, and HR-G8 except when they are not applicable.	Feasibility aspect covered in other portions of the analysis. See other comments above on the requirement to perform a separate feasibility assessment.
RCRE-A2	... At a minimum, INCLUDE the following characteristics for each release category, if applicable: (a) the number of plumes; (b) **the quantity of radionuclides released by species in each time phase of release; these quantities may be expressed in terms of inventories and release fractions** ~~the release fraction of each radionuclide group~~; ...	Suggest to JCNRM, who will work with the L3 working group to ensure consistent wording in the L3 and NLWR standards.
RCPA-A3	... ~~JUSTIFY the use of these applicable documents (e.g., local requirements are more stringent than national requirements, use of international standards in lieu of U.S. standards).~~ **JUSTIFY the input sources used when multiple recognized sources recommend different values (e.g., local requirements**	Suggest to JCNRM for review.

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	are more stringent than national requirements, use of international standards in lieu of U.S. standards).	
RCPA-A10	CC-I **ESTIMATE the evacuation speed based on generic data sources. JUSTIFY the speed used.** CC-II ESTIMATE the evacuation speed based on evacuation studies specific to the site. A constant average evacuation speed for applicable cohort(s) may be used. ...	Suggest to JCNRM for review.
RCME-A2/3/4/7/8	Reference to RG 1.23 or other specific guidance documents	Clarification extends to "how to" and reference to a specific document in the SRs is not appropriate, as it indicates only one acceptable approach to meeting the SR.
RCAD-A5	USE a model that includes wind measurements that are reasonably representative **of the height of the release of** ~~plume travel speed and/or release height~~.	Suggest to JCNRM for review.
RCAD-B2	CC-I DETERMINE bounding meteorological conditions to be used in the analysis (e.g., **the χ/Q value that is exceeded in 5 percent of the total number of hours in the annual data set without regard to wind direction or the maximum — over all sectors — of the sector-specific χ/Q value that is exceeded in 0.5 percent of the total number of hours in the annual data set**~~5th percentile dispersion factor~~).	Clarification extends to "how to."
RCAD-C1	USE dispersion algorithms that characterize atmospheric transport and dispersion ~~from elevated~~ representative of release heights, ~~such as the tops of buildings or stacks.~~ **INCLUDE downwash effects that may lower the effective plume height when using dispersion algorithms that characterize atmospheric transport and**	Clarification extends to "how to."

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	dispersion from representative release heights.	
RCDO-A, A1	The analysis shall include applicable exposure pathways including cloudshine, groundshine, skin deposition, **skin absorption**, inhalation and ingestion, and the effect of mitigation actions on received dose.	Skin absorption not previously mentioned in the standard.
RCDO-A 6/8	CC-I ~~DO NOT INCLUDE ingestion pathways in the model.~~ CC-II ~~USE generic intake quantities of foodstuffs and water.~~ CC-I and CC-II MODEL ingestion pathways consistent with the results of RCDO-A1. USE generic intake quantities of foodstuffs and water.	Suggest to JCNRM. Currently A6 and A8 are developed consistent with the general guidance in performing Capability Category I requirements. The expansion to require detailed skin deposition and ingestion pathways expands the CC I requirements beyond the guidance.
RCQ-A3	COMPILE list of event sequence families and associated radiological consequences **in a manner that is consistent with the release category definitions in ES-C1 and the mechanistic source term parameters in HLR-MS-A.**	Suggest to JCNRM for review.
RCQ-B3	~~IDENTIFY risk-significant contributors (elements) using the SRs of HLR-RI-B.~~ **IDENTIFY significant contributors to results of interest.** See Note RC-N-24	"Results of interest" is an inaccurate term, not used elsewhere in the standard. The consistent term, used in the base SR, is to identify risk significance contributors. Risk-significance is discussed elsewhere in the standard.
SY-N-1	..If ~~there are~~ other ~~unscreened~~ hazards **are included for consideration and evaluation** ~~added to~~ **in** the **PRA** model, there may be additional SSCs that are added to the scope of the Systems Analysis.	Suggest to JCNRM for review. The wording "included for consideration and evaluation in the PRA model" is too wordy, and can be reduced to "model", as originally suggested in the note.
CC-E1	**(h) record of the process and results used to evaluate changes on previously implemented risk-informed decisions**	The PRA standard does not require any documentation specifically for risk-informed decisions, or perform analysis or calculations for any risk-informed applications. The additional requirement is inappropriate for the standard and would be addressed in the specific guidance and NRC endorsement documents for each specific risk-

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		informed application. Additionally, the term "risk-informed decisions" is undefined – and could mean almost any use of the PRA from previously design changes which included considerations of PRA results, procedural reviews by the PRA staff (which occurs regularly for PRA credited procedures) etc.
Section 7.1	For PRAs performed on plants in the pre-operational stage, these requirements apply for newly developed methods that are introduced **at any point during the development of the PRA used to support an application.** ~~following the first peer review performed according to the requirements in Section 6.~~	Any newly developed methods used prior to the initial peer review will be reviewed under the appropriate SRs during the initial Peer Review to establish acceptability in line with the Standard. The original Standard wording for NDM requirements applying after the initial Peer Review remains appropriate
RI-A4/A5	*This requirement does not need to be met to demonstrate PRA acceptability.*	The reporting requirements specified in the NLWR standard are not intended to align with regulator guidance or criteria, but are included as a recognition of the limitations of PRA technology.