PWROG

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PRA Upgrade Definition (and Related Topics) Working Meeting

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Overview

- **PRA Upgrade Definition**
- Risk Significance Definition as it relates to the ASME/ANS PRA Standard
- External Hazards/Screening
- Tiered Peer Review Process

PRA Upgrade Definition

Problem

- Current Definition of PRA Upgrade in the ASME/ANS PRA Standard is inadequate:
  - Highly subject to interpretation
  - Different reviewers frequently come to different conclusion
  - The definitions of PRA Maintenance overlaps with PRA Upgrade
- If determining when a change is a PRA upgrade impacts Tech Spec compliance (TSTS-505), an unambiguous definition is needed

Background

- September Workshop on Model Upgrade:
  - Included primary stakeholders:
    - Utilities (PWROG/BWROG)
    - NEI
    - NRC
    - JCNRM
  - Reviewed ASME/ANS Standard Examples and new Examples provided by Utilities
  - Identified issues with current definition and develop preliminary draft definitions
- October European Workshop
  - European community not bound by ASME/ANS Standard definition
  - Dealing with similar issue with individual regulators
  - No changes to preliminary definitionsd

Background

- November Upgrade Working Meeting
  - Small working group
    - Utilities (PWROG/BWROG)
    - NEI
    - NRC
    - JCNMR
- Challenged/Revised Draft Definitions
- Developed final draft definitions (complete agreement amount working group members)
- Develop final draft process for determining model upgrades

Definitions

- **PRA Upgrade:** A change in the PRA that:
  - results in the applicability of one or more SRs (e.g., the addition of a new hazard model) that were not previously included within the PRA,
  - an implementation of a method in a different context,
  - or the incorporation of a method not previously used.

- **PRA Maintenance:** A change in the PRA that does not meet the definition of PRA upgrade.

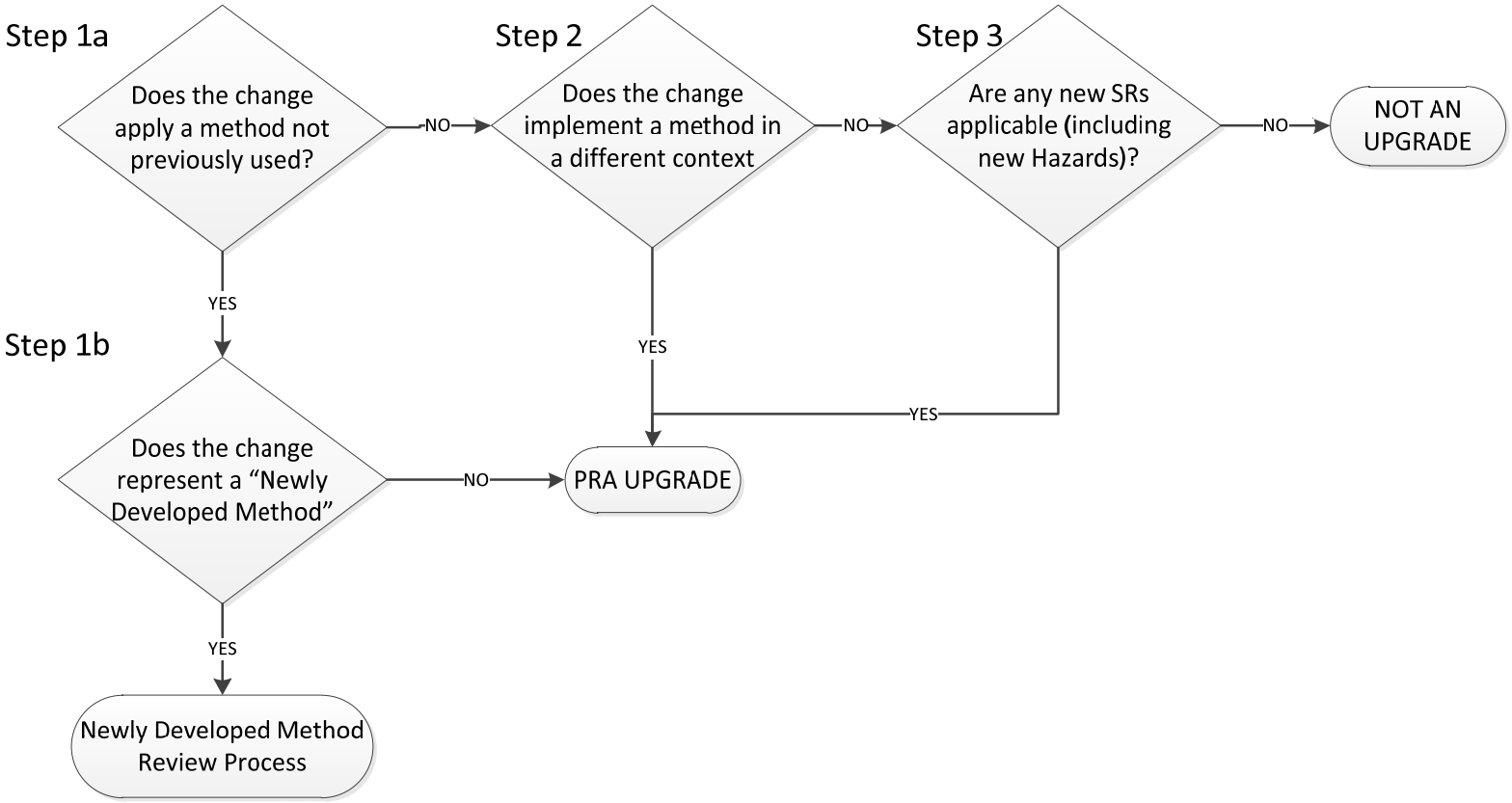
Related Definitions

- **PRA Method:** An analytical approach used to satisfy a supporting requirement or collection thereof in the PRA model. An analytical approach is generally a compilation of the analyses, tools, assumptions, and data used to develop a model.

- **PRA:** a quantitative assessment of the risk, including technical elements for modeled hazards, associated with plant operation and maintenance that is measured in terms of frequency of occurrence of risk metrics, such as core damage or a radioactive material release and its effects on the health of the public [also referred to as a probabilistic safety assessment (PSA)].

- **Newly Developed Method:** A newly developed method is one that has not previously been evaluated through the new method peer review process (see Section 1-6) and either has been developed separately from a state-of-practice method or is one that involves a fundamental change to a state-of-practice method. A newly developed method is accompanied by detailed description and justification of its technical basis.

Proposed Guidance to Determine when a Peer Review is Required



Proposed Guidance to Determine when a Peer Review is Required

- **Step 1a: Does the change apply a method not previously used?**
  - Based on the definition of a PRA method that is provided above, in this Step, the analyst should review the change to determine if a new analytical approach was used to meet any SRs.
  - Open Item: Review RG 1.200 Rev. 3 presentation (9/6) to clarify when a change to a method would constitute a new method.

- **Step 1b: Does the change represent a "Newly Developed Method"?**
  - In this step, the analyst should evaluate whether the change would represent a Newly Developed Method as defined above (see newly developed method section). If the new method simply represents implementation of a state-of-practice method that was not previously implemented, this would be categorized as a PRA Upgrade.
  - Open Item: Review RG 1.200 Rev. 3 presentation (9/6) for words to clarify when a new method is a newly developed method.

Proposed Guidance to Determine when a Peer Review is Required

- **Step 2: Does the change implement a method in a different context?**
  - If a change was not considered a new method in step 1, it should still be further reviewed to determine if it applied a state-of-practice method in a different context. In this case, different context can mean a number of things including:
    - application of a method to support different SRs than it was peer reviewed to
    - applicability of data sources used to develop the models that support the PRA
    - different boundary conditions (using a method for a purpose it was not originally intended for)
    - basic assumptions used in applying the method are fundamentally different
  - Action: Review RG 1.200 Rev. 3 presentation (9/6) for words to help describe when a method is applied in a different context.

Proposed Guidance to Determine when a Peer Review is Required

- **Step 3: Are any new SRs applicable (including new Hazards)?**
  - This step defines a PRA upgrade as those PRA changes that support any SRs that were previously not reviewed or were previously not applicable (N/A) are now applicable and should be reviewed. It is noted that this includes new hazards or new parts of the ASME/ANS PRA Standards.
  - If the original PRA Peer review was performed against CC-I of the standard, any PRA changes that were made that support SRs moving from CC-I to CC-II are considered an upgrade.
  - Resolution of findings from a peer review to CC-II that support moving from CC-I to C-II are not upgrade and should be reviewed by the Finding Closure Process.
  - **Note: that in some cases, if a new method was used to move from CC-I or NOT MET to CC-I or MET, this would be included in Step 1.**

Next Steps

- Apply the draft guidance examples in the standard & from the September workshop
- Determine where this guidance is going to reside
  - Recommendation is to include it in Part I of the ASME/ANS Standard
- Need to find a repository for all the examples
  - Recommendation is to have the industry maintain a publically available list, rather than including the examples in the ASME/ANS Standard
  - PWROG / BWROG & NEI to discuss
- Determine how to track which methods, including newly developed methods, have been peer reviewed
  - PWROG / BWROG & NEI to discuss
- Determine how to track which state-of-practice methods are available
  - PWROG / BWROG & NEI to discuss

Risk Significance

Problem

- Industry has concerns that existing ASME/ANS criteria for Risk Significance is driving additional modeling detail without a commensurate benefit in identifying Risk Insights

Discussion

- Small Working Group with Representatives from:
  - PWROG
  - BWROG
  - NEI
  - NRC
  - JCNRM
- Reviewed Risk Significance Criteria and Supporting Requirements that reference them

Conclusions

- Section 1.1-9 already allows for different criteria to be used (recommend adding the word “generally”):
  - Provide documented justification for use of alternative criteria
  - Alternative criteria must be peer reviewed for their appropriateness and ability to adequately determine risk significance such that the integrity of the PRA model is maintained.
- Awareness of this alternative needs to be promoted to utilities and Peer Review Teams
- Part 4 uses the term “Risk-relevant”. This should be reviewed for consistency with the other parts.

Conclusions

- 95% threshold for summed contribution of sequences:
  - Should somehow account for the risk profile of the plant and the overall CDF/LERF of the hazard
  - “Flat” risk profiles with low CDF/LERF, 95% may be introducing too many items with low individual risk.
- A number of SRs were reviewed specifically, and in most cases, the term “risk-significant” was either not needed, or was not appropriately used.
- The only area that may need less restrictive quantitative criteria is the need for detailed HRA:
  - HR-G1, HR-G5 and HR-G10)

Actions

- PWROG will provide a survey of how many BEs would be determined to be Risk Significant with different FV thresholds

External Hazards/Screening

Problem

- Section 1-1.8 of Part 1 of the Standard has been revised recently (after the October 2018 JCNRM meeting).
  - The changes included making the screening table into “criteria” as opposed to “requirements”.
  - Current draft version of the standard lowers the hazard screening criteria by an order of magnitude (1×10^{-7})
- Can require developing detailed models with Initiating Event Frequencies on the order of 1×10^{-8} /year
  - Doesn’t provide any risk insights
  - Can IEFs be realistically calculated at values this low?

Conclusions

- The screening criteria need to be reviewed for correctness
- The thresholds need to be reviewed
  - It is unclear why some of them were reduced
- The combination of an absolute AND a relative screening criteria may lead to the inability to screen many hazards without needing to perform a calculation to show a conservative representation of its CDF and LERF impact.
- Some absolute screening criteria should be created that exist on their own, without the need for additional relative criteria.

Actions

- Provide Feedback to JCNRM
- Review Screening Criteria for correctness prior to balloting

Tiered Peer Reviews

Tiered Peer Reviews

- The September workshop explored the concept of a tiered peer review process
- The concept would be to reduce the review requirements for those upgrades that have a fairly small scope or for which the licensee has already demonstrate the capability for correctly applying the method
- There may be other non-PRA processes for which the NRC applies a similar approach
- It was agreed to pursue this concept at a later date after initial endorsement of NEI 17-07.

Actions

- OGs to determine what changes would benefit if a tiered review process was available

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