

NRR-DMPSPeM Resource

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Use of New Methods in PRA Models
June 18, 2018

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OBJECTIVES

- Discuss the issue of “New Methods” for TSTF-505 (TS 4B).
- Provide NRC Staff conclusions on NEI’s Proposed License Condition.
- Propose a path forward for all risk-informed applications.

OUTLINE

- Status of Risk-Informed LAR Reviews
- Background on New Methods
- NRC Conclusion on Proposed License Condition for TS 4B
- Options for Path-Forward
 - Use of Industry Peer-Review
- PRA Acceptability
 - Peer Review
 - ASME\ANS PRA Standard
 - RG 1.200
- Transition and Proposed Next Steps

Status of LAR Review Activities

PRA Licensing Branches A & B

- Twelve CFR 50.69 LARs
- Four Tech Spec 4B LARs
- Seven Tech Spec 5B LARs
- Two NFPA 805 LARs
- Five Post NFPA 805 SE LARs
- Seven ILRT LARs
- Five TMRE\TORMIS LARs
- Three RI-ISI LARs
- Six Miscellaneous other LARs

Status of LAR Reviews (Cntd.)

In summary,

- A total of 51 risk-informed LARs under review
- Eighteen Safety Evaluations issued to date in 2018

BACKGROUND –New Methods

- Formation of NRC & Industry RISCs (2015)
 - Vetting Panel process proposed by industry
- NRC developed staff position (to be integrated into RG 1.200)(2016)
- NRC developed internal process to implement Vetting Panel process (2016)
- Industry Developed NEI 16-04 to support “Vetting Panel Process”(2016)

BACKGROUND – New Methods

(Cont'd)

- NRC issued letter granting fee-waiver to pilot Vetting Panel process (2016).
- Several public meetings held on process.
- NEI proposes License Condition for Tech Spec 4B (2017).
- NEI submits responses to staff concerns on NEI's proposed license condition (2018).
- NRC issued proposal for Revision 2 to TSTF-505 (2018).

NRC Conclusions on NEI Proposal

- NRC has significant concerns about tacit approval of new methods proposed in NEI's license condition.
- NRC's oversight framework is not amenable to support NEI proposal.
 - procedures, resources, training needed for resident inspectors not ready.
- Proposed license condition overlooks key safety attributes of Tech Spec 4B.

NRC Conclusion on NEI Proposal (Cont'd)

- NEI proposal would allow self-approved changes to methods
 - New PRA methods traditionally developed to reduce perceived conservative results
 - New methods identified during LAR reviews sometimes apply oversimplified and non-conservative approximations, i.e., realistic can be highly configuration specific and complex
 - Could result in plants operating at relatively high instantaneous CDFs.

NRC Conclusion on NEI Proposal (summarized)

In light of direct influence of numbers generated by PRA models to self-approve changes Tech Spec Completion Times which often include exposure to single failure vulnerability and could result in plants operating at relatively high instantaneous CDFs and some challenges associated with the implementation of the peer-review & F&O Closure Processes, NRC staff does not understand how the License Condition proposed by NEI would adequately control PRA methods within the existing licensing and oversight infrastructure.

Forward Path for Tech Spec 4B LAR Reviews

- NRC continues to review four LARs on Tech Spec 4B.
- NRC will use the license condition proposed in Revision 2 of TSTF 505 Model SE.

Options for Path Forward

- Development of the Vetting Panel Process.
 - NRC still considers this as a viable option
 - Need to address staff and industry concerns
- NRC approval of a subset of “significant” new methods.
 - Align on determining the subset of new methods that require prior NRC approval
 - Can provide regulatory stability
- Use of industry peer-review and the F&O closure process.

Industry Peer-Review

- Peer-review teams “review, document, & report” new methods
 - Enhancement (guidance) needed for each of these items
 - NRC responsibility to “accept and/or approve,” as appropriate
- Infrastructure (e.g., ASME/ANS PRA Standard, RG 1.200, NEI-17-07) needs enhancement to address missing requirements
- A risk-informed oversight process will complement licensing activities

Use of Industry Peer-Review Process (some pros)

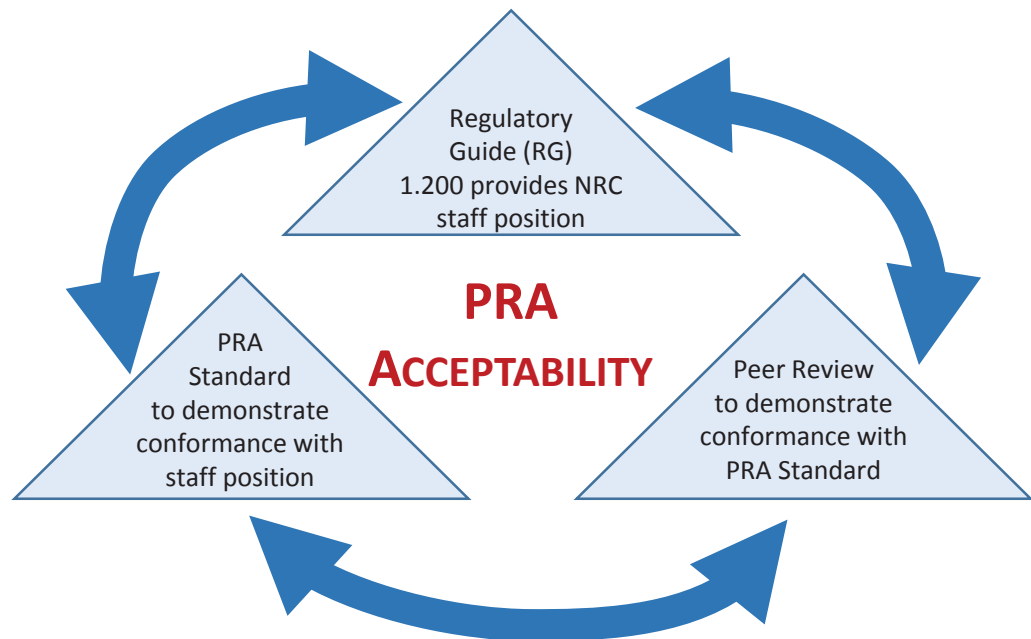
- Consistent with past agency\industry practices and leverages NRC and industry investments
- Creates potential to reduce undue burdens to licensees & NRC staff.
- Creates the potential to mitigate “application specific” nature of the issue.

Use of Industry Peer Review -Some Key Issues

- What is a “New Method?”
- What is a “Newly Developed Method?”
- What are the criteria that needs to be used to review New Methods?
- What are the needed qualifications of the peer-reviewers who would be reviewing New Methods?
- other.....

PRA Acceptability – 3 Elements

- All 3 elements have to work together to demonstrate PRA acceptability



ASME/ANS PRA Standard – New PRA Methods and PRA Upgrade vs Maintenance

- Major issue, standard now requires the peer review to address new PRA methods
 - Standard did not provide the necessary requirements for the peer review
 - No criteria for new method acceptability
 - No qualifications for the peer review team members
 - Standard silent on resolution of peer review findings
- Standard addresses PRA upgrade versus maintenance in a non-mandatory appendix
 - Guidance is unclear and open to different interpretations
- NRC has provided comments with regard to:
 - Independent Assessment
 - Peer review of new PRA method
 - Definitions
 - PRA upgrade versus maintenance

NEI 17-07, “Performance of PRA Peer Reviews Using the ASME/ANS PRA Standard”

- NEI 17-07 “replaces” NEI 05-04, 07-12, and 12-13 and is to support other developed PRA standards (e.g., Level 2)
- “Appendix ‘x’” (Independent Assessment) to be added to NEI 17-07
- NEI 17-07 includes guidance for peer review of new methods or focused peer review for an PRA upgrade
- NRC staff has initiated its review
 - Plans to share staff review in fall of 2018
 - Will endorse in Revision 3 to RG 1.200

Regulatory Guide 1.200 – Revision 3 (1/4)

- Numerous changes being considered
- With regard to Section C.2 -- Consensus PRA Standards and Industry PRA Programs
 - Adding subsection addressing Independent Assessment Process
 - Adding staff position as noted in May 2017 letter providing interim approval
 - Adding to staff position on peer review of new methods
 - Criteria for determining new method
 - Needed attributes and characteristics for new method acceptability
 - Needed qualifications of the peer reviewer
 - Adding to staff position on determining PRA upgrade versus maintenance
- Adding section on definitions; for example:
 - PRA, PRA method, new PRA method, PRA upgrade, PRA maintenance

Regulatory Guide 1.200 – Revision 3 (2/4)

- Staff position on new methods, definitions, etc.
 - Consistent with staff comments submitted to JCNRM on the new edition to the PRA standard
 - For example, staff comment on new method acceptability:
 - *“When reviewing a new method, the analyst shall evaluate:*
 - *How the uncertainties are addressed*
 - *Whether appropriate for the context*
 - *The validity of assumptions*
 - *Input data are relevant and technically sound*
 - *Produces results comparable to similar methods (e.g., bases for differences are understood)*
 - *Representation of the plant*
 - *Based on proven theories”*

Regulatory Guide 1.200 – Revision 3

(3/4)

- For example, staff comment on definition:
 - *method: is the compilation of the analyses, tools, assumptions, and data used develop a model that reflects the performance of the entity under consideration. For example, application of the MELCOR code, a system level code which contains engineering analyses and assumptions supported by experimental data, is the method used to develop a response model that predicts the performance of the core during PRA transients.*
 - *new method: if the analyses, tools, assumptions or data associated with the method have fundamentally changed even if the output of the model does not significantly change. Moreover, a method is also new if it is being used in a different application/context that was originally designed. A new method is one that has been: (1) developed separate from an existing method, (2) modified from an existing method, or (3) the method is used in different context that was originally intended.*
- PRA upgrade versus maintenance
 - Process being developed assesses how the change to the PRA model impacts the technical element(s)

Regulatory Guide 1.200 – Revision 3 (4/4)

- Path Forward:
 - Public meeting in late summer to share staff proposed process for new method and PRA upgrade versus maintenance
 - Additional public meetings to be scheduled as needed
 - To be incorporated into Revision 3 of RG 1.200

TRANSITION

- Work towards empowering peer-reviewers to “review, document & report” most newly developed methods.
 - NRC is not delegating method approval authority to peer-review teams.
 - Oversight will be relied to ensure safety

TO ENABLE TRANSITION

- Align on review criteria that will be used by peer reviewers to evaluate new & newly developed methods
- Align on experience of peer-reviewers who will be qualified to review new or newly developed methods
- Align on the timing on how\when to revise models to address peer review findings on new or newly developed methods
- Align on characteristics of the subset of newly developed methods that requires prior NRC approval

PROPOSED NEXT STEPS

- 2018-2019: Planned update to ASME\ANS PRA Standard (e.g., incorporating criteria for reviewing methods)
- 2019-2020: Planned update to RG 1.200 (e.g., incorporate clear definition of “upgrade” vs “update”)
 - Endorsement of new edition to the ASME/ANS standard
 - Endorsement of NEI 17-07
- 2019-2020: test and pilot the peer review of new methods
- 2018-2019: Developing a framework for oversight (e.g., periodic verifications on acceptable configuration management of PRA models)

BACK-UP SLIDES

NEI-06-09-A (Staff Evaluation of NEI-06-09-A)

“As part of its review and approval of a licensee’s application requesting to implement the RMTS, the NRC staff intends to impose a license condition that will explicitly address the scope of the PRA and non-PRA methods approved by the NRC staff for use in the plant-specific RMTS program. If a licensee wishes to change its methods, and the change is outside the bounds of the license condition, the licensee will need NRC approval, via a license amendment, of the implementation of the new method in its RMTS program. The focus of the NRC staff’s review and approval will be on the technical adequacy of the methodology and analyses relied upon for the RMTS application.”

License Condition on Vogtle TS 4B

“The risk assessment approach and methods, shall be acceptable to the NRC, be based on the as-built, as-operated, and maintained plant, and reflect the operating experience of the plant as specified in RG 1.200. Methods to assess the risk from extending the completion times must be PRA methods accepted as part of this license amendment, or other methods approved by the NRC for generic use. If the licensee wishes to change its methods, and the change is outside the bounds of this license condition, the licensee will seek prior NRC approval, via a license amendment.”

Revision 2 of TSTF-505

Section 2.2.2.e of Model SE to TSTF 505

“The risk assessment approaches and methods shall be acceptable to the NRC. The plant PRA shall be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at the plant, as specified in Regulatory Guide 1.200, Revision 2. Methods to assess the risk from extending the completion times must be PRA methods used to support this license amendment, or other methods approved by the NRC for generic use; and any change in the PRA methods to assess risk that are outside these approval boundaries require prior NRC approval.”

50.69 License Condition

Rev. 1 of RG 1.201, (May 2006)

- *As part of the NRC's review and approval of a licensee's or applicant's application requesting to implement §50.69, the NRC staff intends to impose a license condition that will explicitly address the scope of the PRA and non-PRA methods used in the licensee's categorization approach. If a licensee or applicant wishes to change its categorization approach and the change is outside the bounds of the NRC's license condition (e.g., switch from a seismic margins analysis to a seismic PRA), the licensee or applicant will need to seek NRC approval, via a license amendment, of the implementation of the new approach in their categorization process. The focus of the NRC staff's review and approval will be on the technical adequacy of the methodology and analyses relied upon for this application (Rev. 1 to RG 1.201).*
- Note: LAR is required when there is a change in the "categorization approach."

TSTF-505, Rev. 2, Model SE, Section 2.2.2.e (May 2018)

- *2.2.2.e. The risk assessment approaches and methods shall be acceptable to the NRC. The plant PRA shall be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at the plant, as specified in Regulatory Guide 1.200, Revision 2. Methods to assess the risk from extending the completion times must be PRA methods used to support this license amendment, or other methods approved by the NRC for generic use; and any change in the PRA methods to assess risk that are outside these approval boundaries require prior NRC approval.*
- Note: LAR is required when there is a change in the “PRA Methods.”