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10 CFR 50.69 Regulatory Overview

NRC/NEI Workshop

March 5th, 2025

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50.69 Categorization of SSCs

RISC-1 Safety-Related, Safety Significant	RISC-2 Non-Safety Related, Safety Significant
RISC-3 Safety-Related, Low Safety Significant	RISC-4 Non-Safety Related, Low Safety Significant

Periodic Review

- RISC-1, -2, -3 and -4 SSCs: review plant changes, operational experience, and update categorization and treatment every 2 refueling outages.
- RISC-1 and -2 SSCs: monitor performance and make adjustments as necessary.
- RISC-3 SSCs: consider data collected in 50.69(d)(2)(i) to determine any adverse performance and make adjustments as necessary.

RISC-3 and 4 STRs Eliminated by 10 CFR 50.69

- 10 CFR Part 21 for reporting defects and noncompliance
- Portion of 10 CFR 50.46a(b) imposing 10 CFR Part 50, Appendix B
- 10 CFR 50.49 for environmental qualification of electric equipment
- 10 CFR 50.55(e) for reporting safety significant issues
- Inservice Testing (IST) in 10 CFR 50.55a(f); Inservice Inspection (ISI), and repair and replacement (with exception of fracture toughness), for ASME Class 2 and 3 SSCs in 10 CFR 50.55a(g); and electrical component quality and qualification in Section 4.3 and 4.4 of IEEE 279, and Sections 5.3 and 5.4 of IEEE 603-1991, as incorporated by reference in 50.55a(h)

RISC-3 and 4 STRs Eliminated by 10 CFR 50.69

- 10 CFR 50.65, except for paragraph (a)(4), regarding maintenance rule
- 10 CFR 50.72 for immediate notification requirements.
- 10 CFR 50.73 for licensee event report system.
- Appendix B, Quality Assurance (QA) Criteria, to 10 CFR Part 50
- Type B and Type C leakage testing requirements in both Options A and B of Appendix J to 10 CFR Part 50, for penetrations and valves with specific criteria.
- Appendix A to Part 100, Sections VI(a)(1) and VI(a)(2), to the extent that these regulations require qualification testing and specific engineering methods to demonstrate that SSCs are designed to withstand the Safe Shutdown Earthquake and Operating Basis Earthquake

References

- 10 CFR 50.69 “Risk-informed categorization and treatment of structures, systems, and components for nuclear power reactors”
- NEI 00-04, “10 CFR 50.69 SSC Categorization Guideline,” Revision 0, dated July 2005 (ML052900163).
- Regulatory Guide 1.201, “Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to their Safety Significance,” Revision 1, dated May 2006 (ML061090627).

QUESTIONS

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License Application Review Process for 10 CFR 50.69

NRC/NEI Workshop
March 5, 2025

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Office of Nuclear Reactor Regulation
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PRA Licensing Branch A

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TOPICS

- PRA Acceptability
- Review of Facts and Observations (F&O'S) Closure
- Review of Key Sources of Uncertainty
- Use of FLEX in PRA Models
- Alternative Methods
- Other Best Practices
- Questions

PRA Acceptability

Review of Facts and Observations (F&O's) Closure

- NRC reviews the F&O closure process during its assessment of the licensee's peer review process to ensure the technical acceptability of the licensee's PRA.

- Licensee's closure of F&O's using endorsed guidance prior to submittal of LARs has increased the NRC staff efficiency in technical reviews while maintaining commitment to public health and safety.

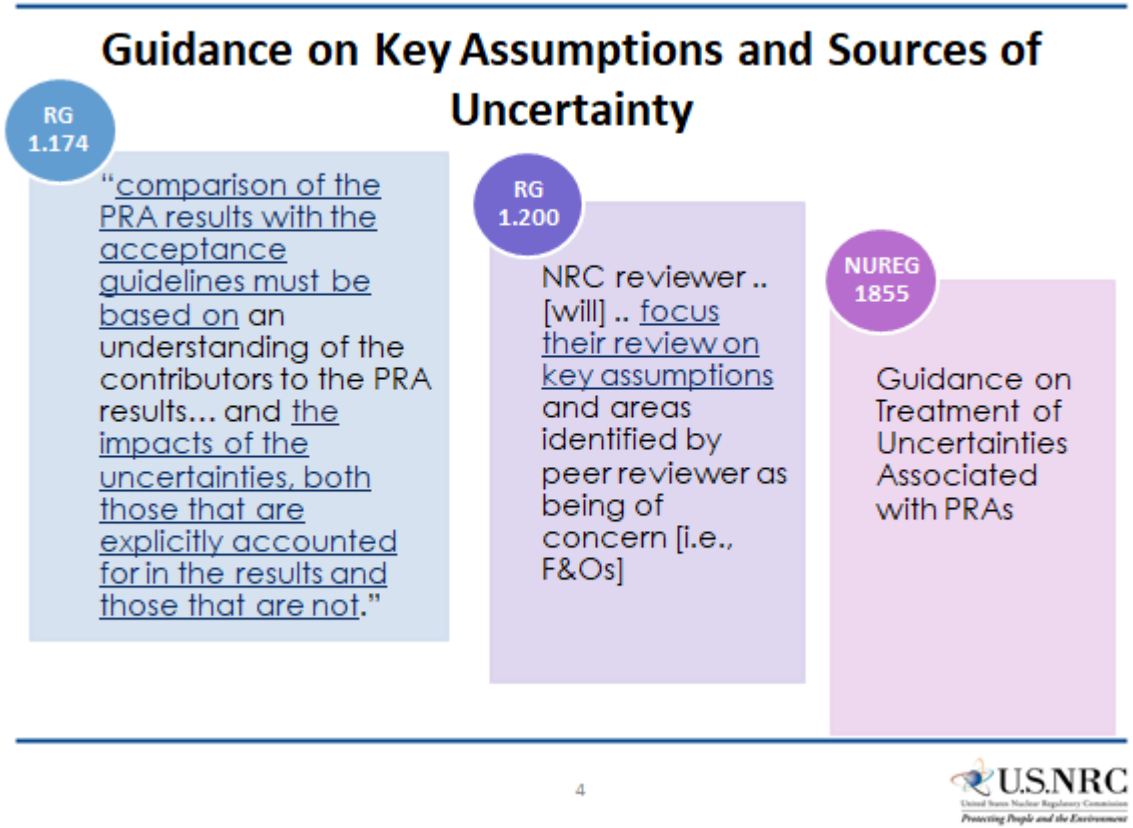
Review Of Key Sources of Uncertainty

- The LAR should assess how the PRA assumptions and sources of uncertainty affect the SSC categorization results.

- Licensee should consider PRA assumptions and sources of uncertainty from the PRA notebooks and from generic sources in EPRI 1016737[1] and EPRI 1026511[2].

- For PRA assumptions and sources of uncertainty determined to be "key" for the application, the LAR should state how these will be addressed to minimize any potential adverse impacts on the SSC categorization results.

NRC Guidance on Key Assumptions and Sources of Uncertainty



Use of FLEX in PRA Models

- The NRC supports enhancing safety by utilizing a wider range of flexible and diverse coping strategies (FLEX) and will continue to provide credit for FLEX in both licensing and oversight.

- The industry guidance and NRC's updated assessment dated May 6, 2022[3] for crediting FLEX in PRAs have established a consistent and predictable approach for incorporating FLEX in risk-informed applications.

- Additional important guidance on how to apply HRA to FLEX[4] and how to calculate equipment reliability data for FLEX[5] have also been created.

- The industry's adoption of this guidance for integrating FLEX strategies in PRAs has enhanced the efficiency of NRC staff technical reviews while upholding a dedication to public health and safety.

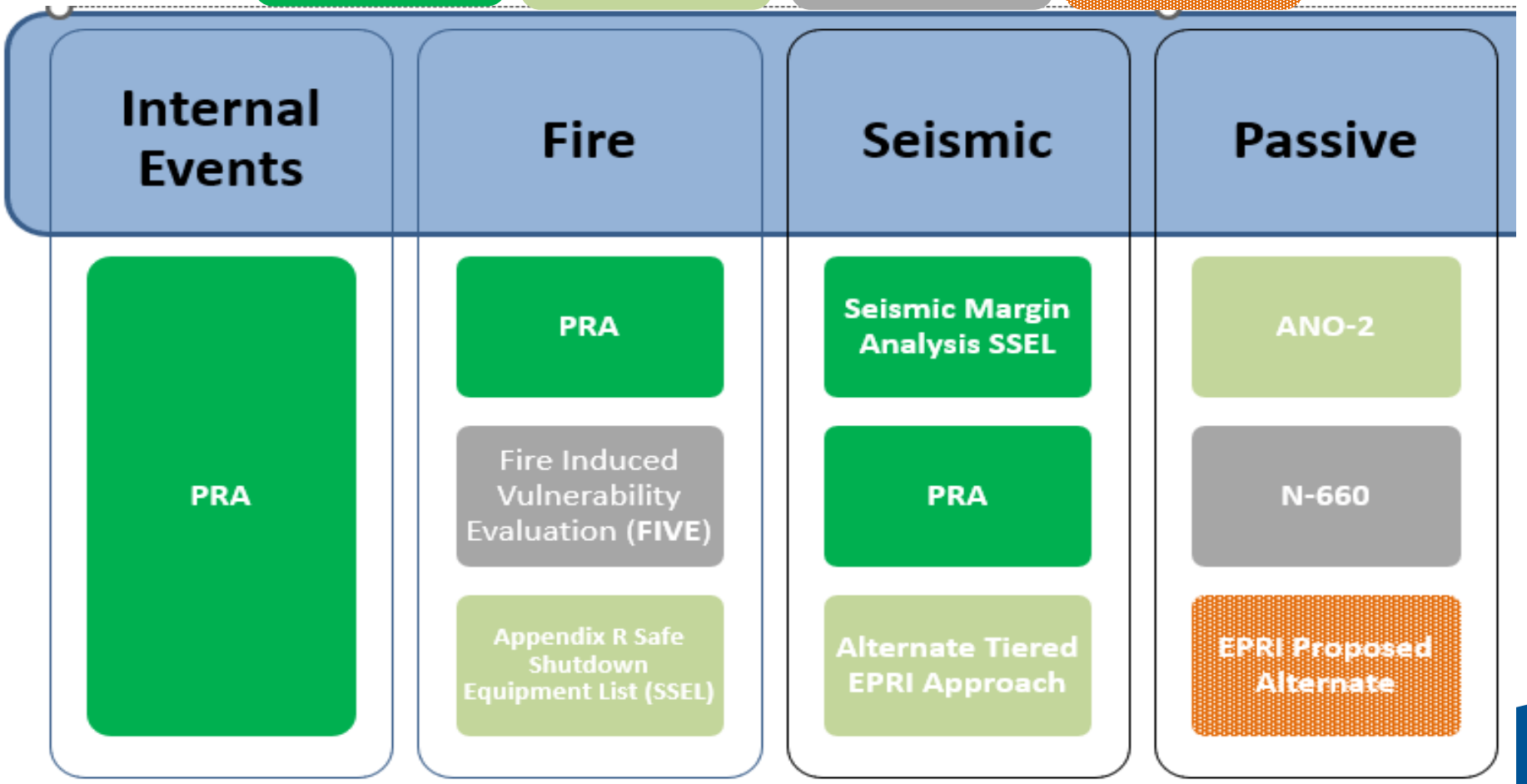
Alternative Methods

In RG 1.201 AND used in LARs

Not yet in RG 1.201

In RG 1.201 NOT used in LARs

Under Review



Alternative Tiered EPRI Seismic Approach

- A three-tiered approach for plants with low, medium and high seismic hazard/margin (EPRI Report 3002017583[6]) – it can be especially useful for plants without an SPRA or SMA

- To support the approach, EPRI Report uses seismic PRAs to identify insights related to seismic risk
  - Demonstrates that most seismic risk significant SSCs are already captured by the internal events and/or fire PRAs
  - Identifies unique seismic insights and failure modes

- Tier 1 (low risk) approved for many plants
- Tier 2 (medium risk) approved for several plants
- Tier 3 (high risk, SPRA) approved for several plants

Other Best Practices

- Adherence to NEI templates have been beneficial to ensure necessary and sufficient information is included for NRC staff to facilitate technical reviews.

- Virtual audit practices when practicable have increased efficiency of reviews while reducing expenses occurred with travel costs.

- Audits and licensee supplements continue to remain successful in providing closure to knowledge gaps and obviating the need for multiple requests for information.

References

1 EPRI Technical Report 1016737, “Treatment of Parameter a0nd Modeling Uncertainty for Probabilistic Risk Assessments”

2 EPRI Technical Report 1026511 “Practical Guidance of the Use of Probabilistic Risk Assessment in Risk-Informed Applications with a Focus on the Treatment of Uncertainty”

3 Updated Assessment of Industry Guidance for Crediting Mitigating Strategies in Probabilistic Risk Assessments (ADAMS Accession No. ML22014A084)

4 EPRI 3002013018, “Human Reliability Analysis (HRA) for Diverse and Flexible Mitigation Strategies (FLEX) and Use of Portable Equipment: Examples and Guidance”

5 PWROG-18042-NP Revision 1, “FLEX Equipment Data Collection and Analysis” (ADAMS Accession No. ML22123A259)

6 EPRI Technical Report 3002017583, “Alternative Approaches for Addressing Seismic Risk in 10 CFR 50.69 Risk-Informed Categorization” (ADAMS Accession No. ML21082A170)

QUESTIONS

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10 CFR 50.69 Oversight Experience

NRC/NEI Workshop

March 5, 2025

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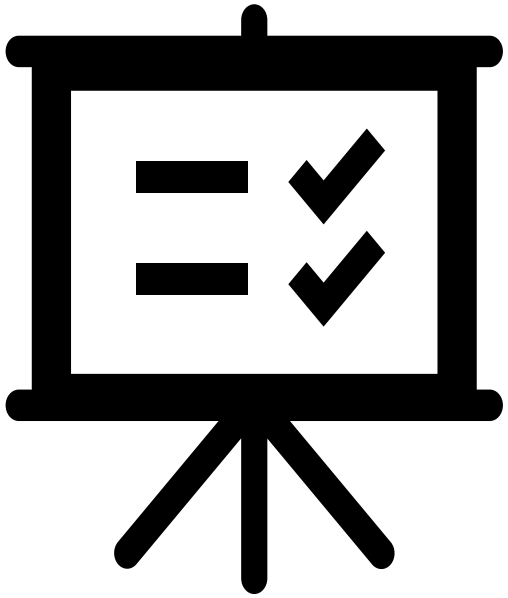
TOPICS



- Implementation Inspection Procedure
- Baseline Inspection Procedures
- Inspection Results
- Inspection Discussion
- Questions

Implementation Inspection Procedure

- IP 37060 50.69 Implementation Inspection
  - Review Program/Procedures
    - Program and PRA comply with regulations, license condition, and categorization process as approved in SE.
  - Review Program Implementation
    - Categorization of SSCs followed the approved process.
  - Review Problem Identification and Resolution
    - Mechanisms to track/evaluate RISC-3 deficiencies.
  - Review Feedback and Process Adjustments
    - Periodic Program Reviews.

50.69 Baseline Inspection Procedures

- IP 71111.12 – Maintenance Effectiveness
  - Inspection guidance regarding RISC-3 SSCs.
- IP 71111.18 – Plant Modifications
  - Consideration of updates to the PRA model regarding 50.69.
- IP 71111.21.N.02 – Design-Basis Capability of Power-Operated Valves Under 10 CFR 50.55A Requirements
  - Inspection of testing and maintenance requirements for POVs that have been categorized under 50.69.
    - Alternative treatments – RISC-3
    - Important to safety – RISC-2

50.69 Baseline Inspection Procedures

- IP 71111.21.N.03 – Commercial Grade Dedication
  - 50.69 alternative procurement treatment.
- IP 71111.24 – Testing and Maintenance of Equipment Important to Risk
  - Sample selection consideration for RISC-2 SSCs.

In Addition…

- PRA Configuration Control Smart Sample
  - Performed six times – no violations identified; one minor issue and one observation
- NUREG 1022 – Event Reporting Guidelines, Revision 3, Supplement 2
  - Added paragraph in section 2.

Inspection Results

- IP 37060 Inspection Results
  - Six plants inspected 2016 – 2024.
  - Three plants – no issues that were more than minor.
  - Three Green NCVs and one licensee identified NCV:
    - improper passive categorization - improper operator action credit;
    - failure to identify all safety significant supported functions for a component;
    - inadequate/failure to perform defense-in-depth categorization review for multiple components.

Inspection Results

- Baseline Inspection Results
  - Two Green NCVs on 2023 (IP 71152 – Problem Identification and Resolution), one Green NCV in 2024 (IP 71111.12 – Maintenance Effectiveness).
  - All three NCVs associated with 50.69(e), “Feedback and Process Adjustment,” with related alternative treatment issues:
    - RISC-3 SSC failures not evaluated per 50.69(e);
    - special treatment removed, but no alternative treatment applied, and RISC-3 failures not evaluated per 50.69(e).

Inspection Discussion

- Plant/Vendor Coordination
  - Look for results that don't make sense.
  - Make sure the vendor gets the information they need, not just the information they ask for.
- Program/Plant Coordination
  - Confirm the program documents/procedures clearly reflect the regulatory requirements.
  - Make sure that plant personnel implementing the program procedures understand the underlying regulatory requirements.

Inspection Discussion

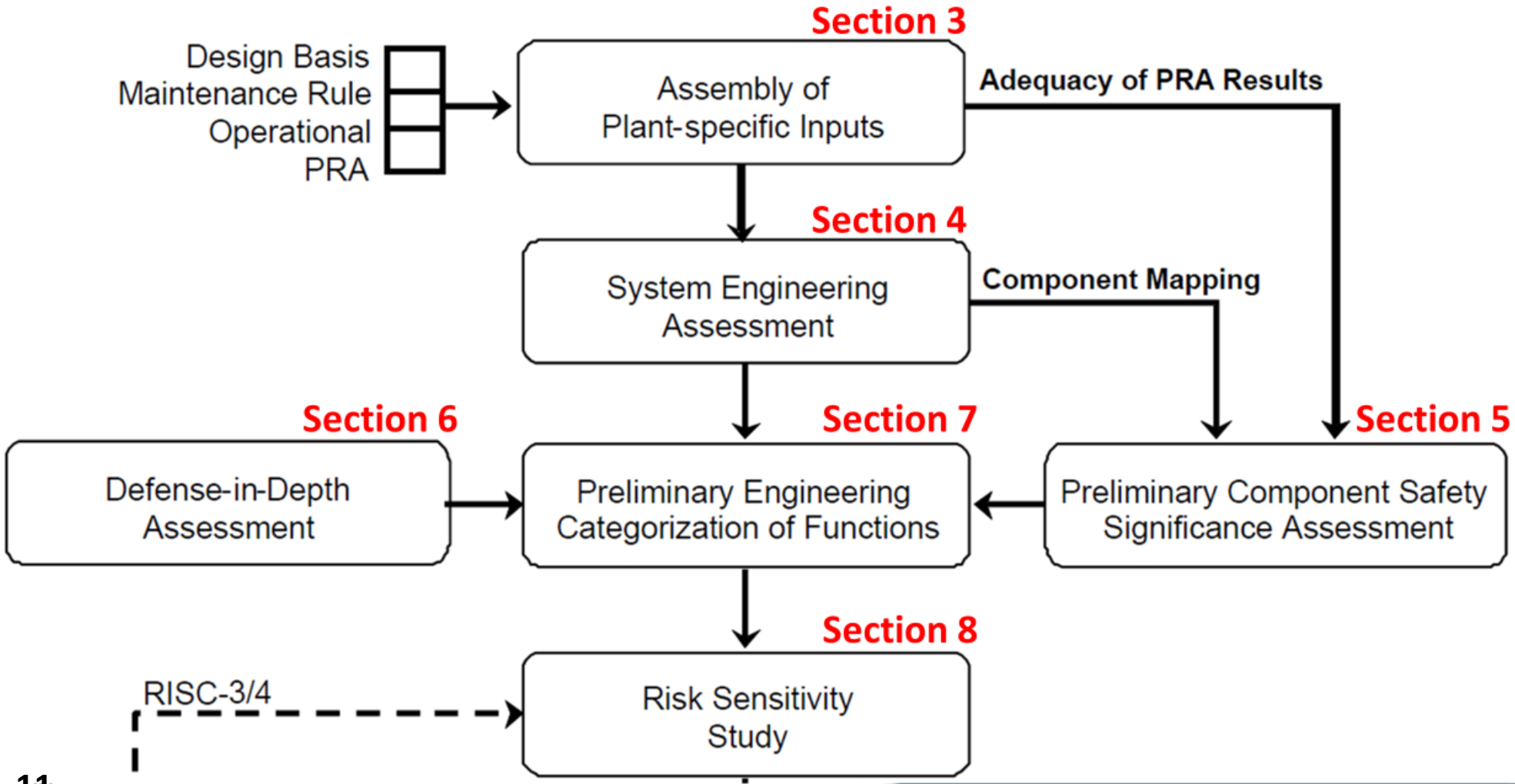
- Alternative Treatments
  - 50.69(b) is not a “de facto” exemption
  - Allows alternative treatment instead of compliance with 11 specific special treatment regulations.
  - Must continue to comply with special treatment regulation unless alternative treatment is established.
  - 50.69(e) – two issues related to periodic reporting:
    - no alternative treatment established, and/or
    - no programmatic mechanism between component failure information and periodic review

Inspection Discussion

- 50.69 License Condition Requirements:
  - Requires that implementation be consistent with the NEI 00-04 categorization process methodology or approved alternatives.
  - Requires implementation of non-PRA categorization methods approved in the license amendment.
  - Changes to the approved categorization methodologies must receive NRC approval prior to implementation.
  - 50.69 License Condition Elevates NEI 00-04 Guidance to a Regulatory Requirement.
    - Failure to follow the guidance is a non-compliance with the plant Operating License.
    - Important to recognize how sections of the guidance link to meeting the regulation.

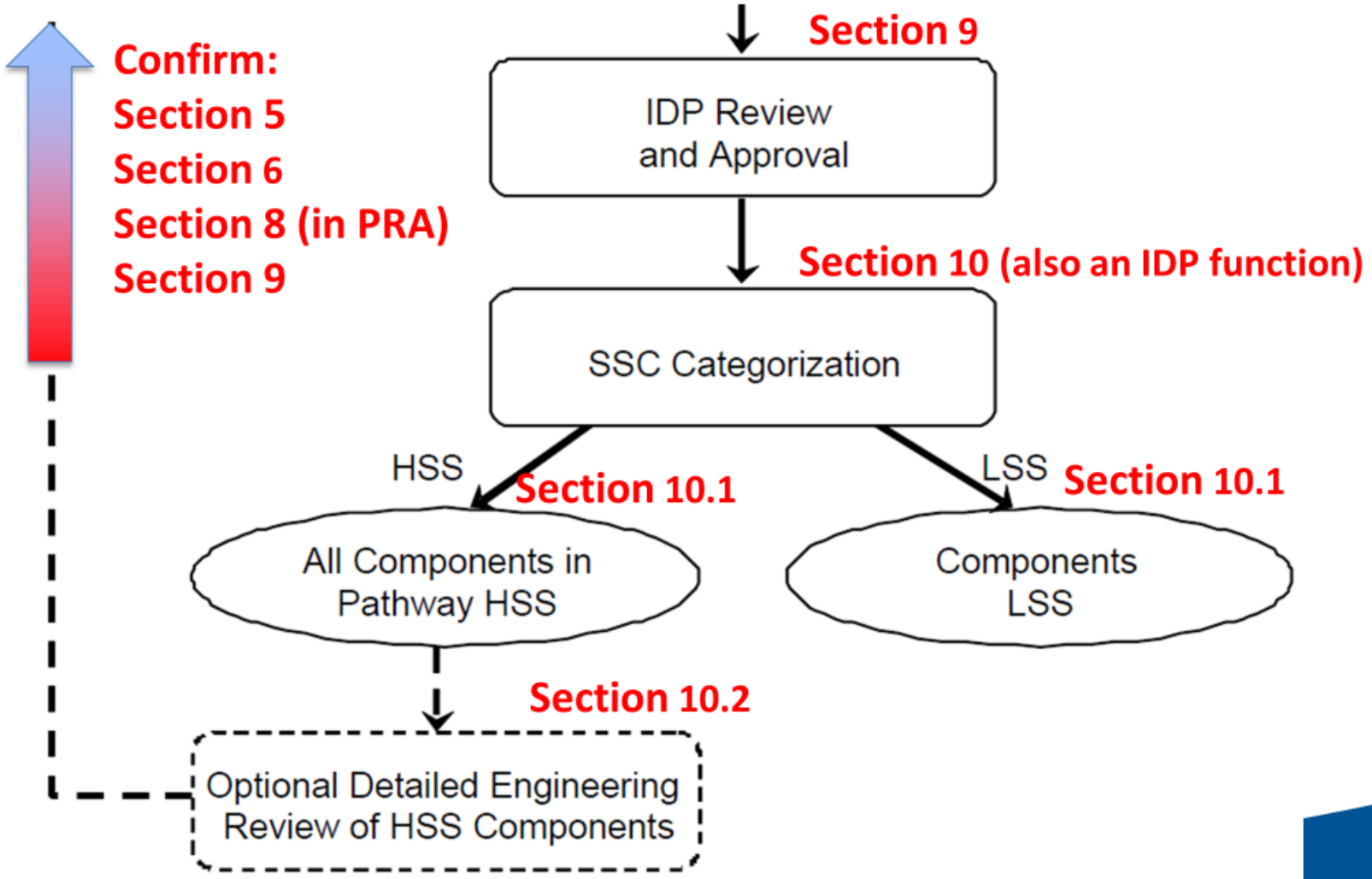
GENERAL INSPECTION ITEMS

NEI 00-04 Figure 2-1 Risk Informed Categorization Process



GENERAL INSPECTION ITEMS

NEI 00-04 Figure 2-1 Risk Informed Categorization Process (continued)



GENERAL INSPECTION ITEMS
IDP Allowed Consideration for HSS to LSS

Table from LAR and approved in NRC SE as consistent with NEI 00-04.

HSS to LSS consideration **not allowed** if HSS due to:

- IEPRA
- integrated PRA importance measures
- Shutdown
- DID
- passive categorization

Table 3-1: Categorization Evaluation Summary

Element	Categorization Step - NEI 00-04 Section	Evaluation Level	IDP Change HSS to LSS	Drives Associated Functions
Risk (PRA Modeled)	Internal Events Base Case – Section 5.1	Component	Not Allowed	Yes
	Fire, Seismic and Other External Events Base Case		Allowable	No
	PRA Sensitivity Studies		Allowable	No
	Integral PRA Assessment – Section 5.6		Not Allowed	Yes
Risk (Non-modeled)	Fire, Seismic and Other External Hazards –	Component	Not Allowed	No
	Shutdown – Section 5.5	Function/Component	Not Allowed	No
Defense-in-Depth	Core Damage – Section 6.1	Function/Component	Not Allowed	Yes
	Containment – Section 6.2	Component	Not Allowed	Yes
Qualitative Criteria	Considerations – Section 9.2	Function	Allowable[1]	N/A
Passive	Passive – Section 4	Segment/Component	Not Allowed	No

HSS to LSS consideration **allowed** if HSS due to:

- SPRA
- FPRA
- sensitivity studies outlined in Section 5

QUESTIONS