

Principles of guideline

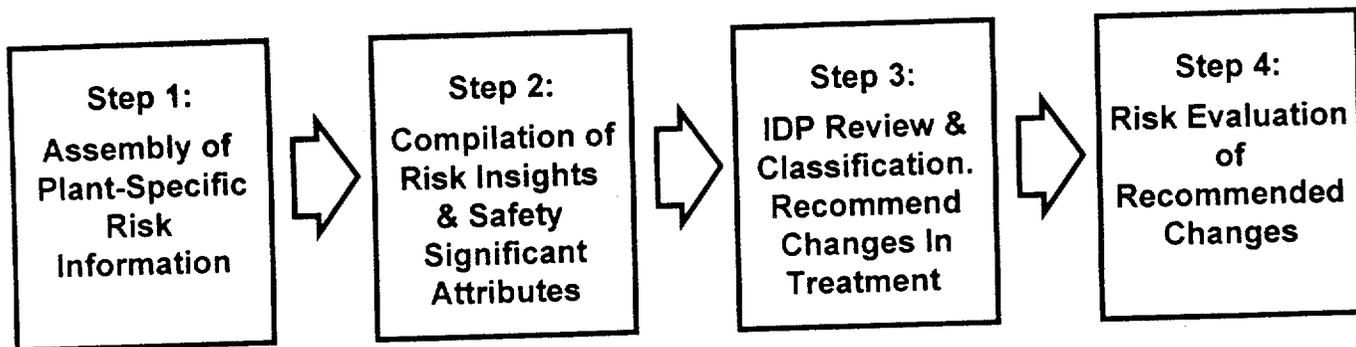
- Reg guide 1.174 principles
- Use all available risk information
- Rely on qualitative information if PRA information not available
- Determine SSC attributes of importance
- If no engineering basis developed, no change to classification

Categorization

- Sequential consideration of internal events, fire, seismic, external events, shutdown
- Importance measures and sensitivity studies
 - Details still under development
- Use of FIVE, Seismic margins, NUMARC 91-06 if necessary
- Integrated decisionmaking panel



Risk-Informed Classification Process



Resources:

- ✓ Internal Events PRA
- ✓ Fire PRA/FIVE
- ✓ Seismic PRA/Seismic Margins
- ✓ External Events PRA/IPEEE Screening
- ✓ Shutdown PSA/Shutdown Safety Management
- ✓ SSC Design Basis Information

Includes:

- ✓ Risk Significance Assessments
- ✓ Integrated Risk Significance Assessment
- ✓ Initial Identification of Safety Significance
- ✓ Identification of Safety Significant Attributes
- ✓ Basis for Low Safety Significance for Safety Related SSCs

Considers:

- ✓ Risk Insights
- ✓ Safety Significant Attributes
- ✓ Operating History
- ✓ Deterministic Considerations
- ✓ Defense-in-Depth
- ✓ Safety Margins

Determines:

- ✓ Specific Changes In Treatment
- ✓ Monitoring

Includes:

- ✓ Qualitative Assessment of Treatment Impacts
- ✓ Risk Sensitivity Studies
- ✓ Evaluation of Monitoring Effectiveness

Figure 2.4-1
OVERALL SAFETY SIGNIFICANCE PROCESS

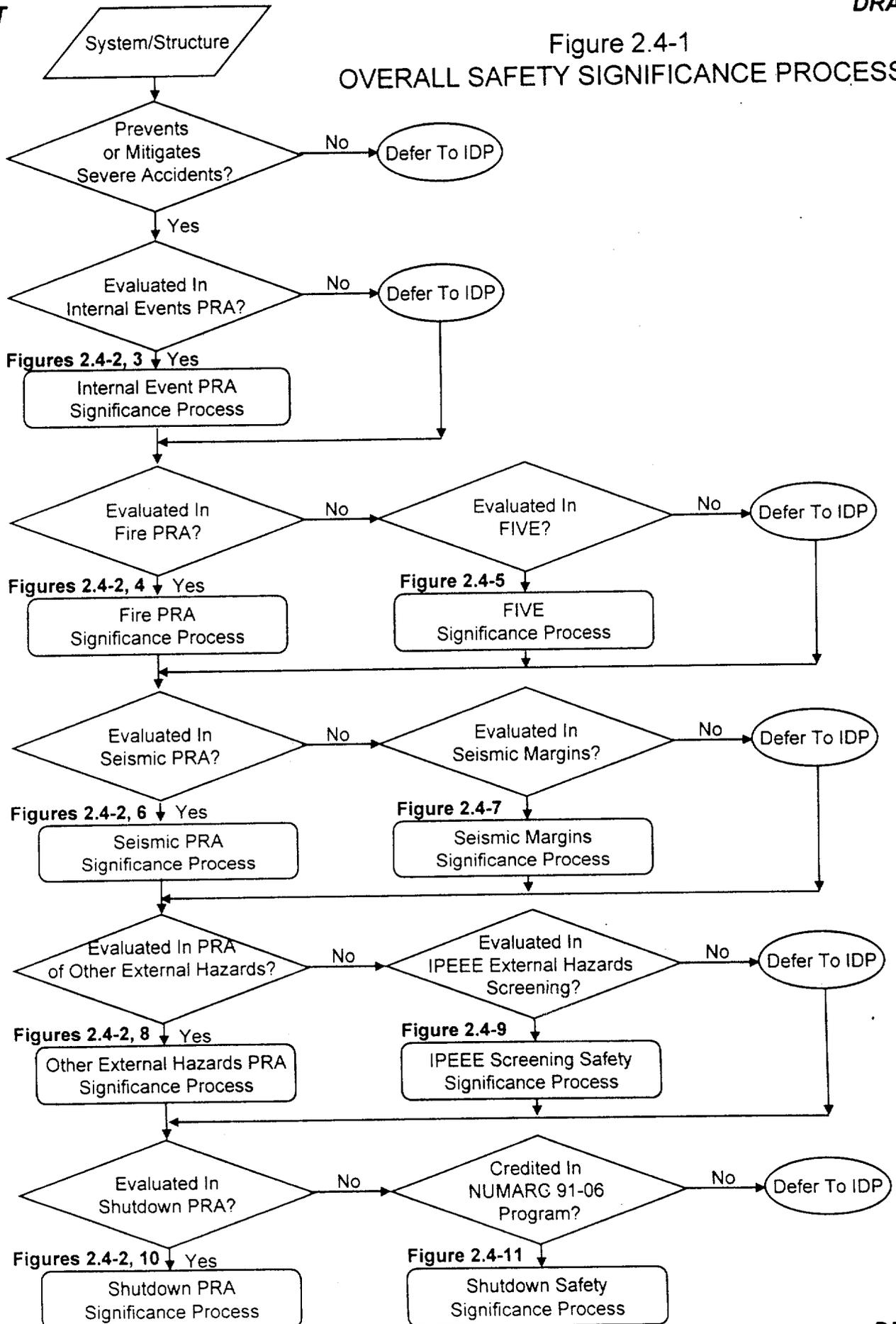


Figure 2.4-2

GENERALIZED SAFETY SIGNIFICANCE PROCESS FOR SYSTEMS AND COMPONENTS ADDRESSED IN PRA

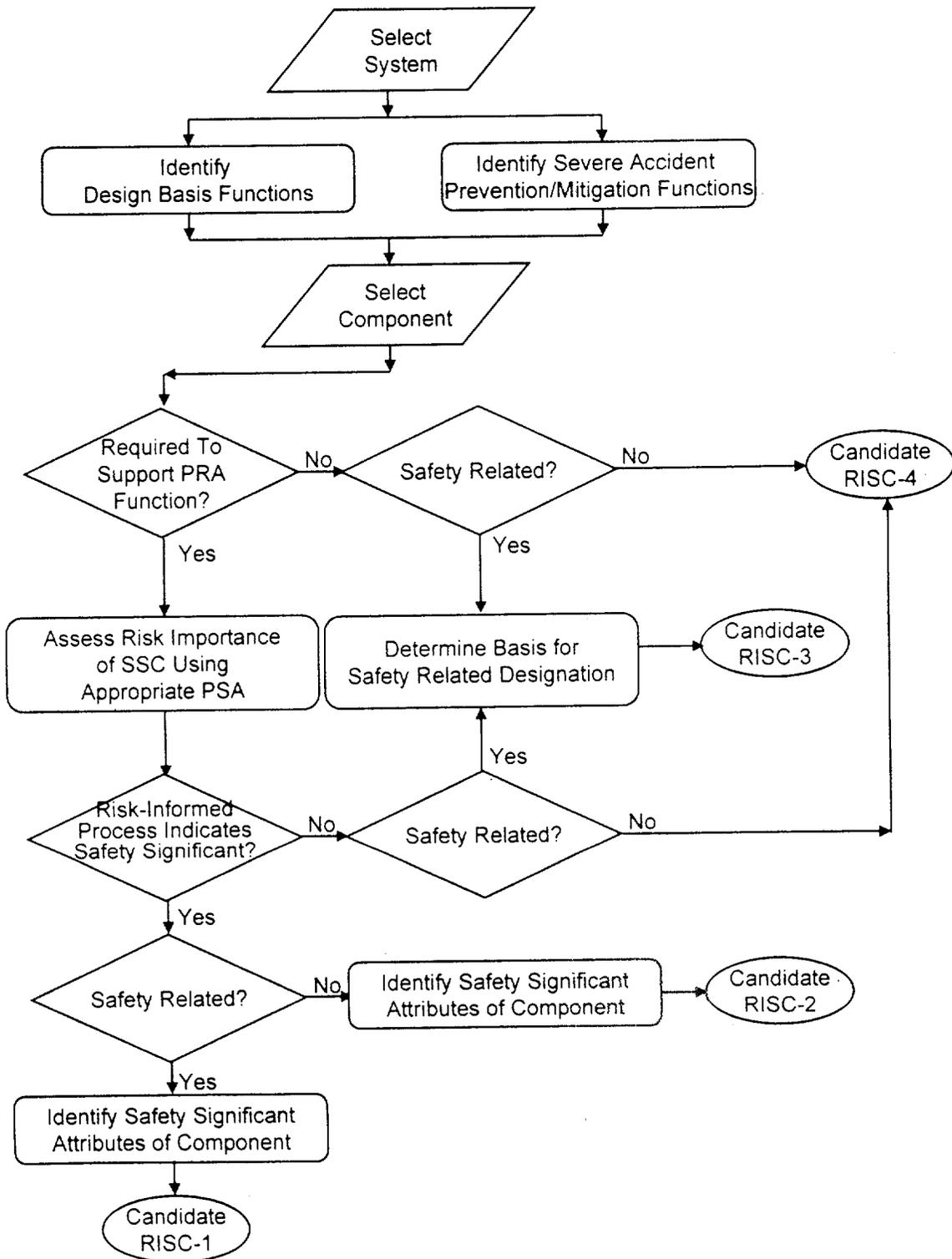


Figure 2.4-3
RISK IMPORTANCE PROCESS FOR COMPONENTS ADDRESSED IN
INTERNAL EVENTS AT-POWER PRAs

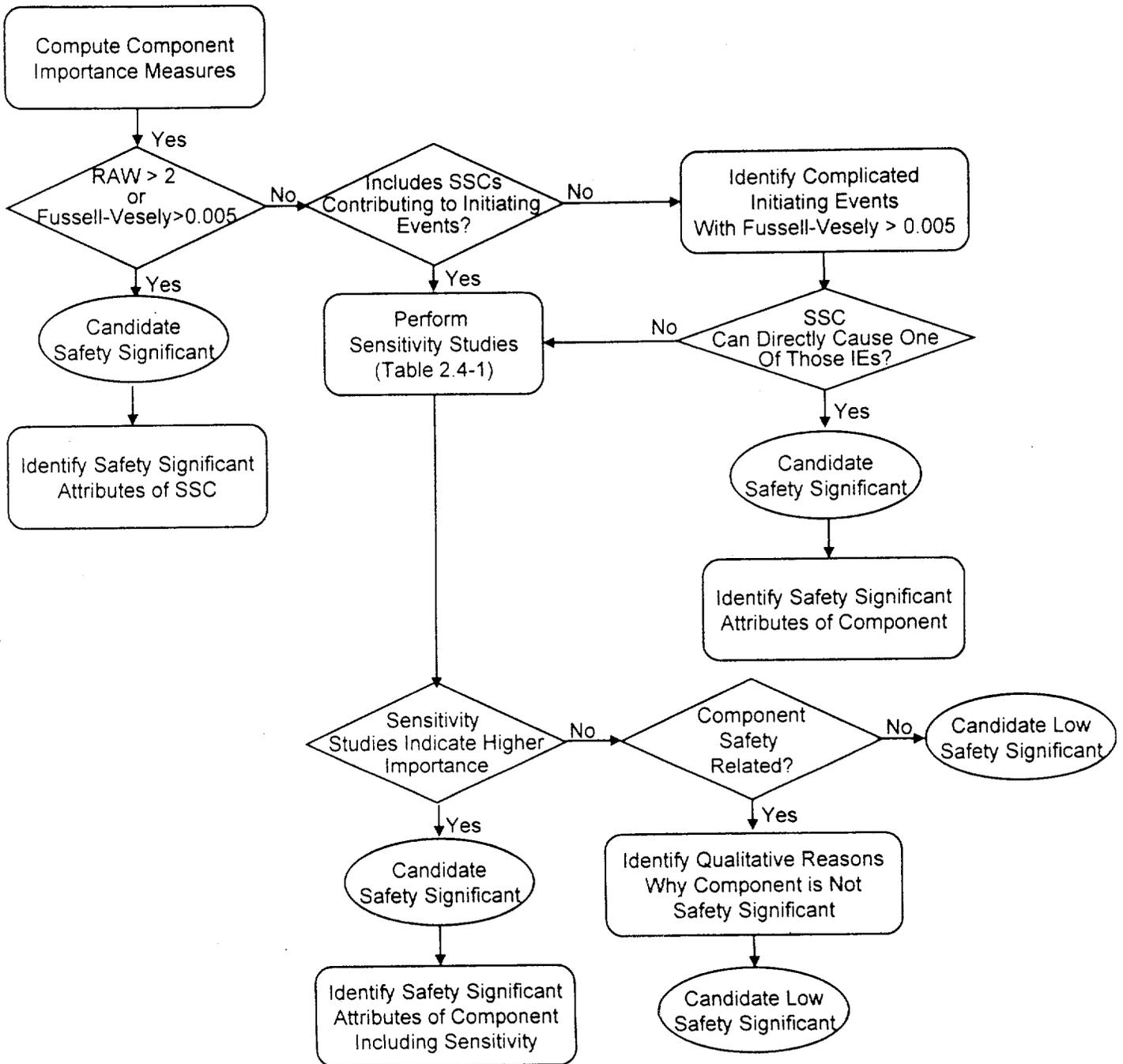


Figure 2.4-4
RISK IMPORTANCE PROCESS FOR COMPONENTS
ADDRESSED IN FIRE PRAs

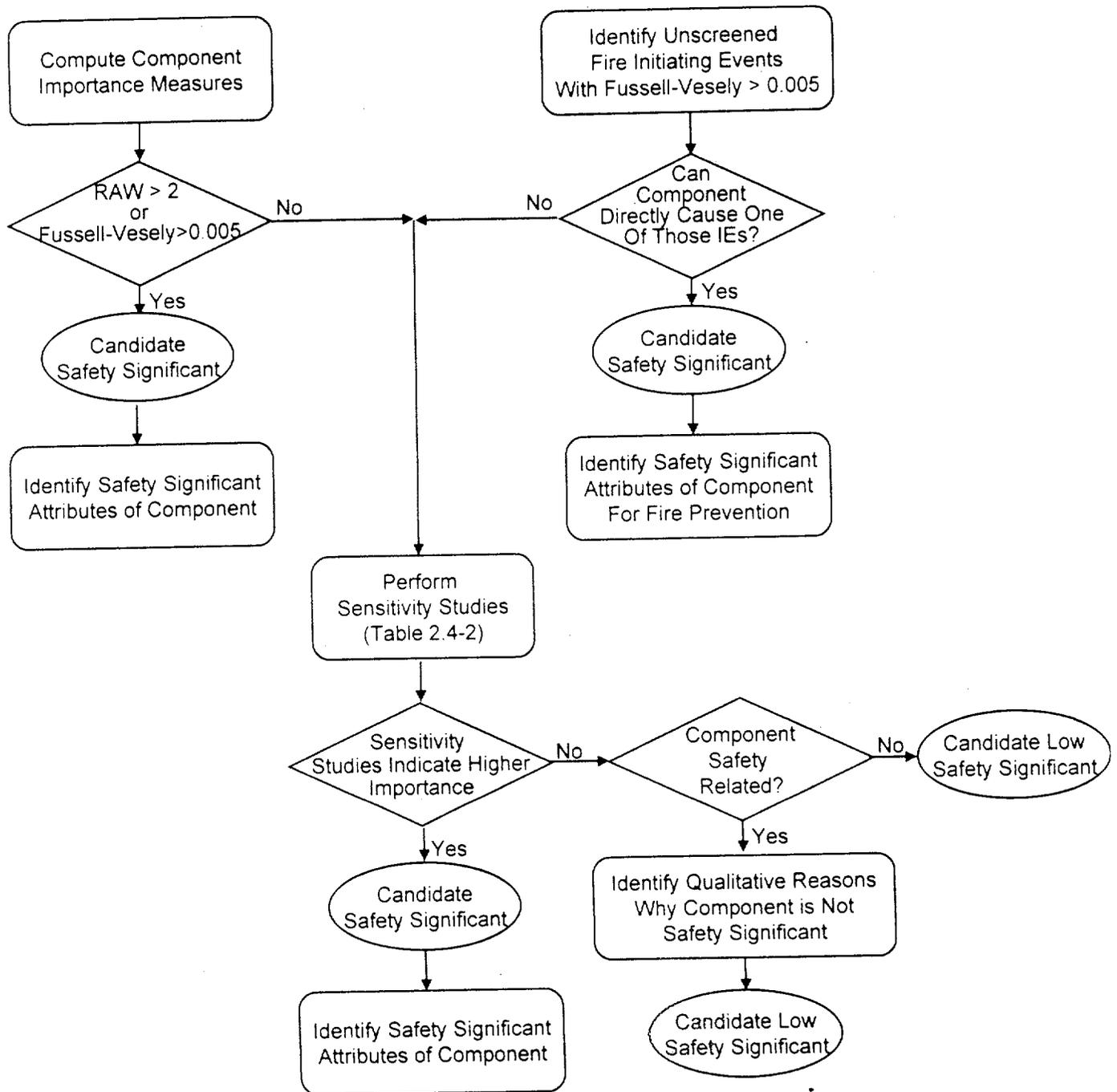


Figure 2.4-5
SAFETY SIGNIFICANCE PROCESS FOR
SYSTEMS AND COMPONENTS ADDRESSED IN FIVE

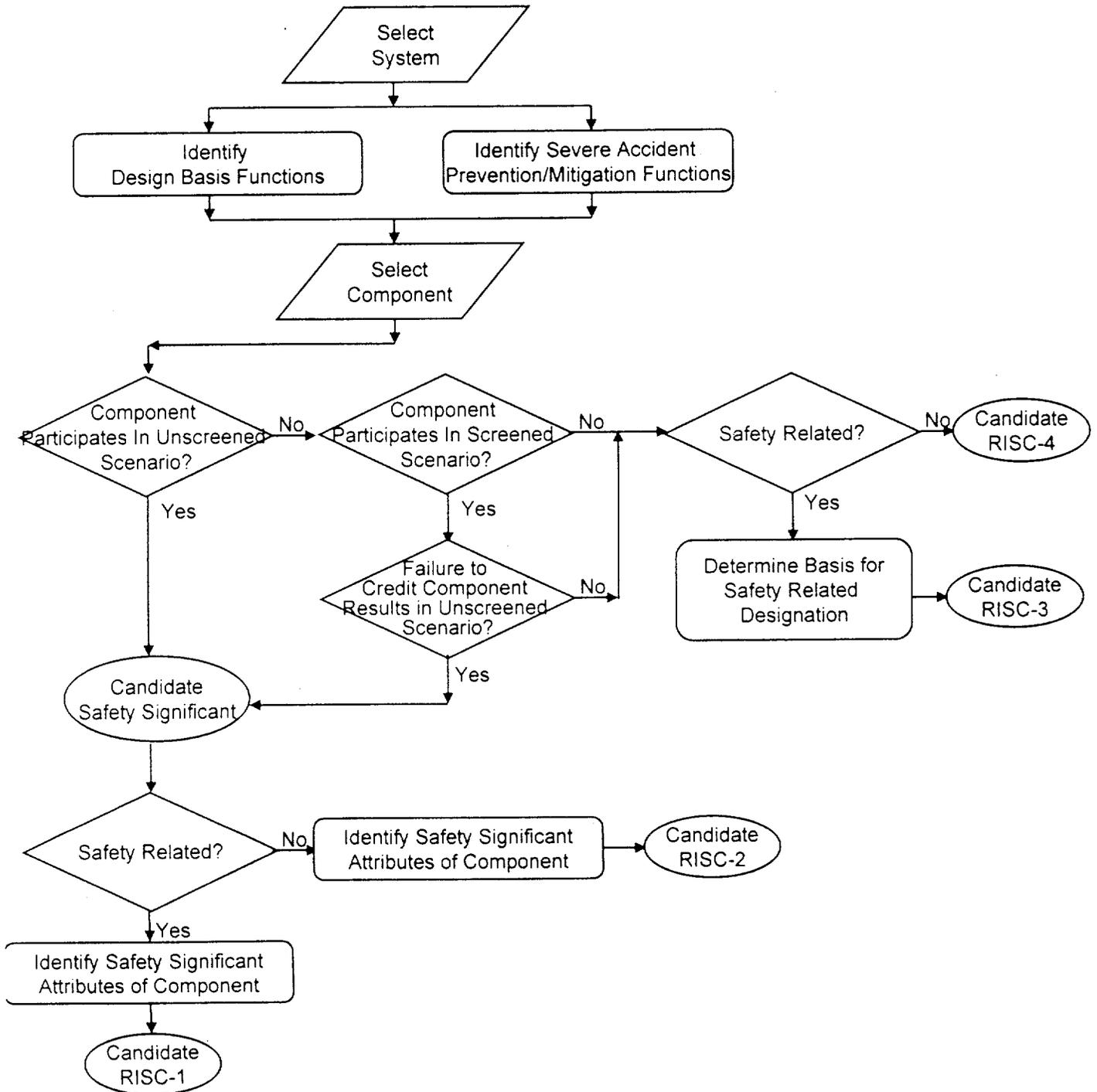


Figure 2.4-6
RISK IMPORTANCE PROCESS FOR COMPONENTS
ADDRESSED IN SEISMIC PRAs

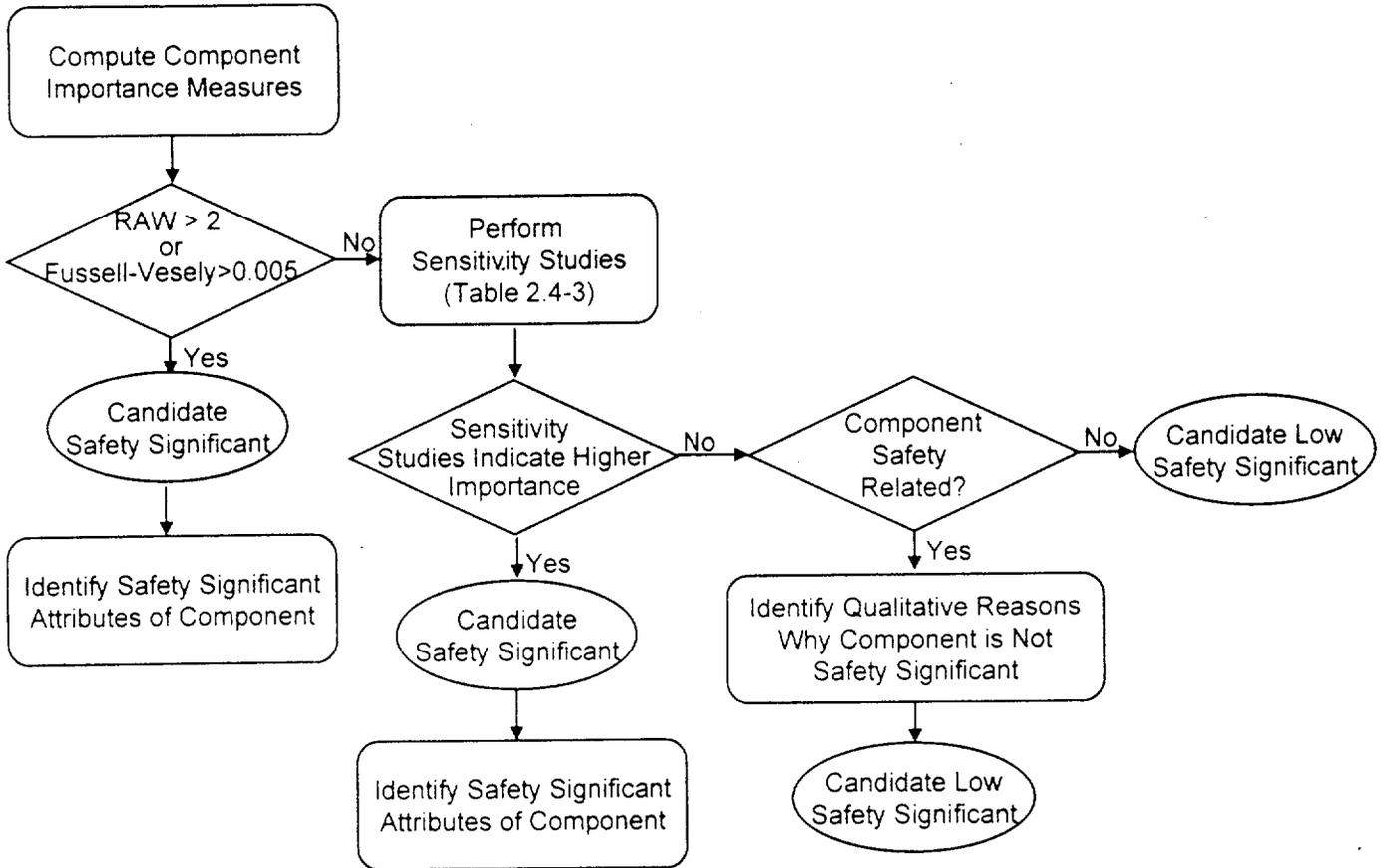


Figure 2.4-7
SAFETY SIGNIFICANCE PROCESS FOR
SYSTEMS AND COMPONENTS ADDRESSED IN SEISMIC MARGINS

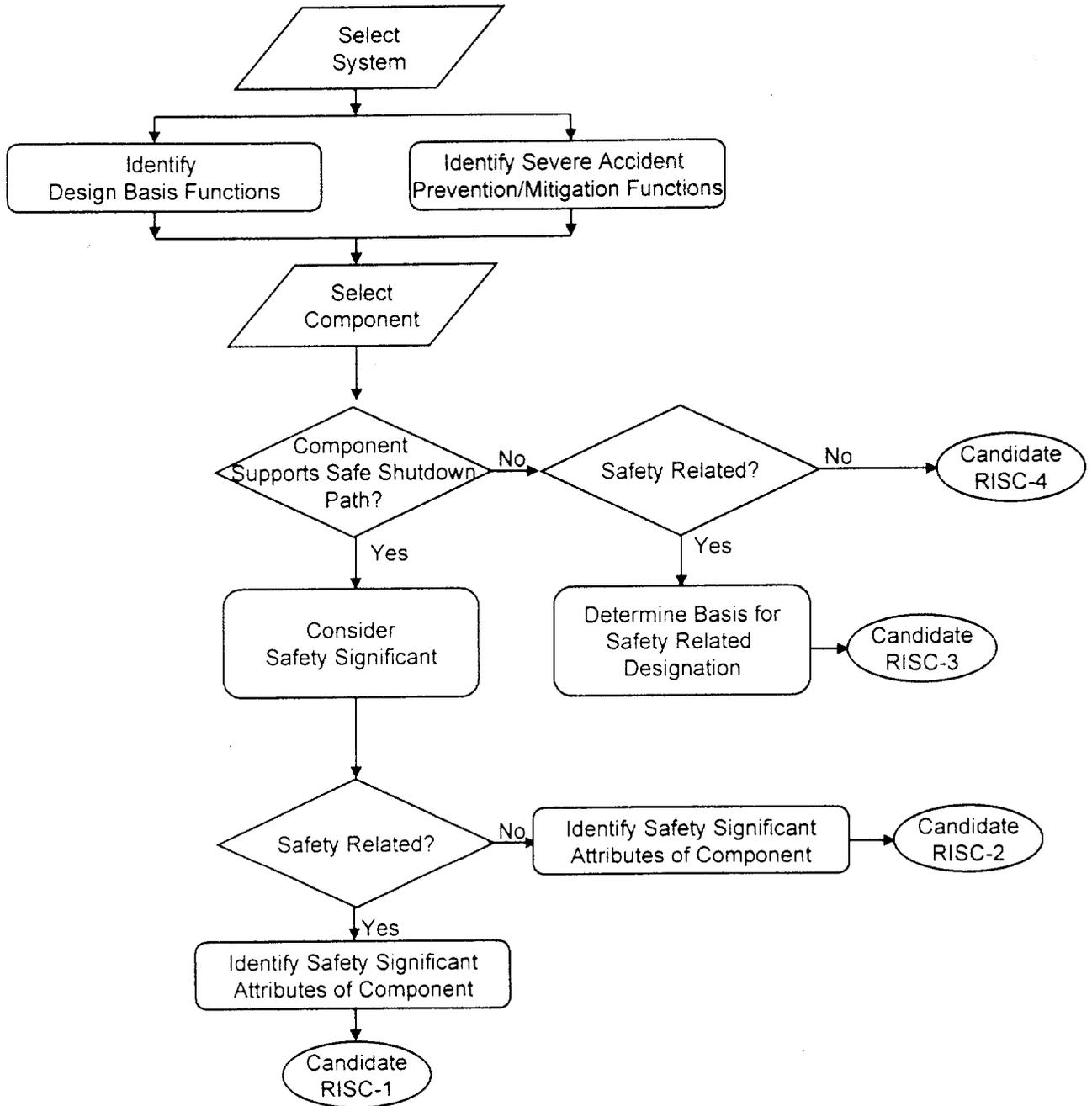
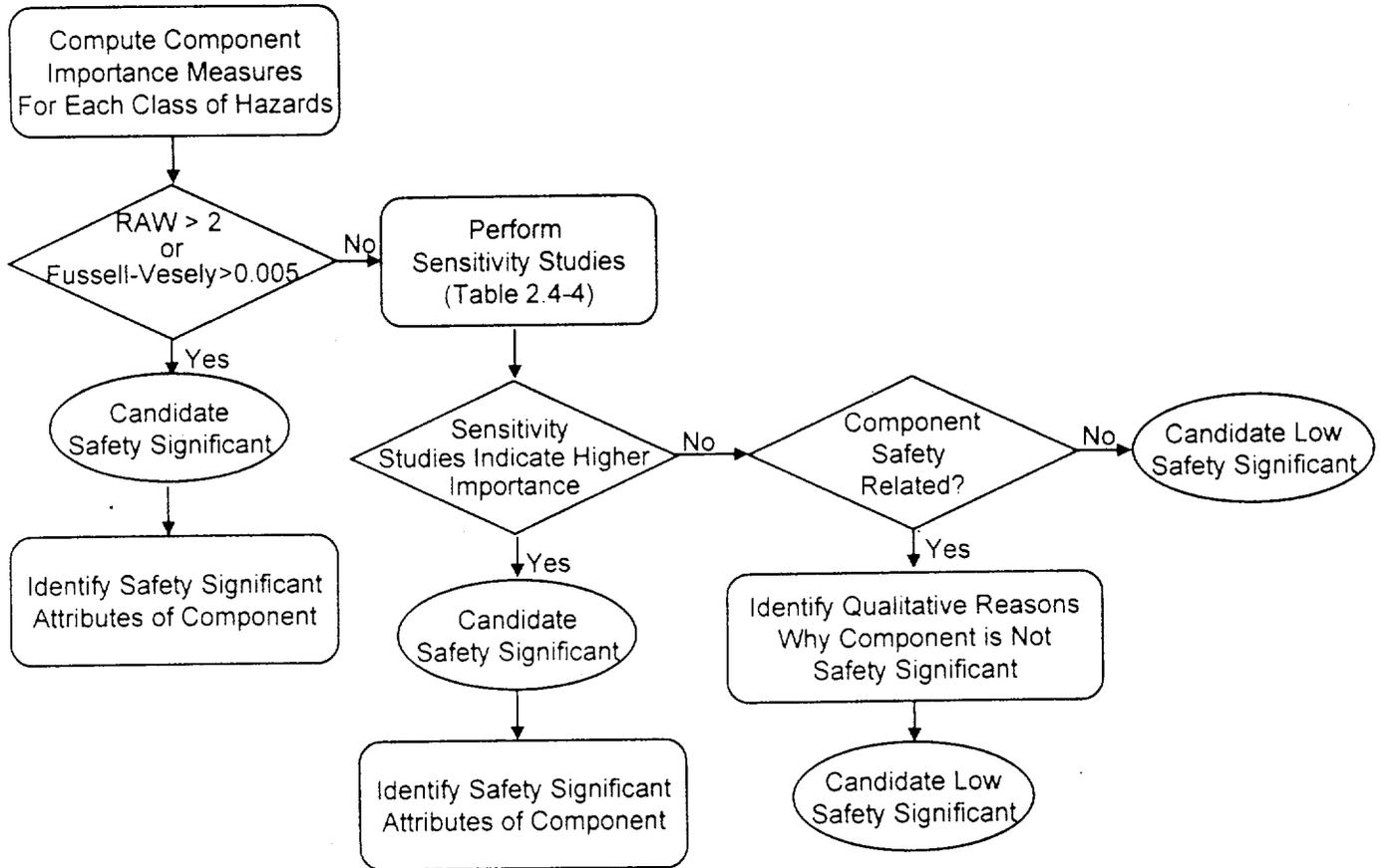


Figure 2.4-8
RISK IMPORTANCE PROCESS FOR COMPONENTS
ADDRESSED IN EXTERNAL EVENT PRAs



NOTES

Figure 2.4-9
SAFETY SIGNIFICANCE PROCESS FOR
SYSTEMS AND COMPONENTS ADDRESSED
IN EXTERNAL EVENT SCREENING

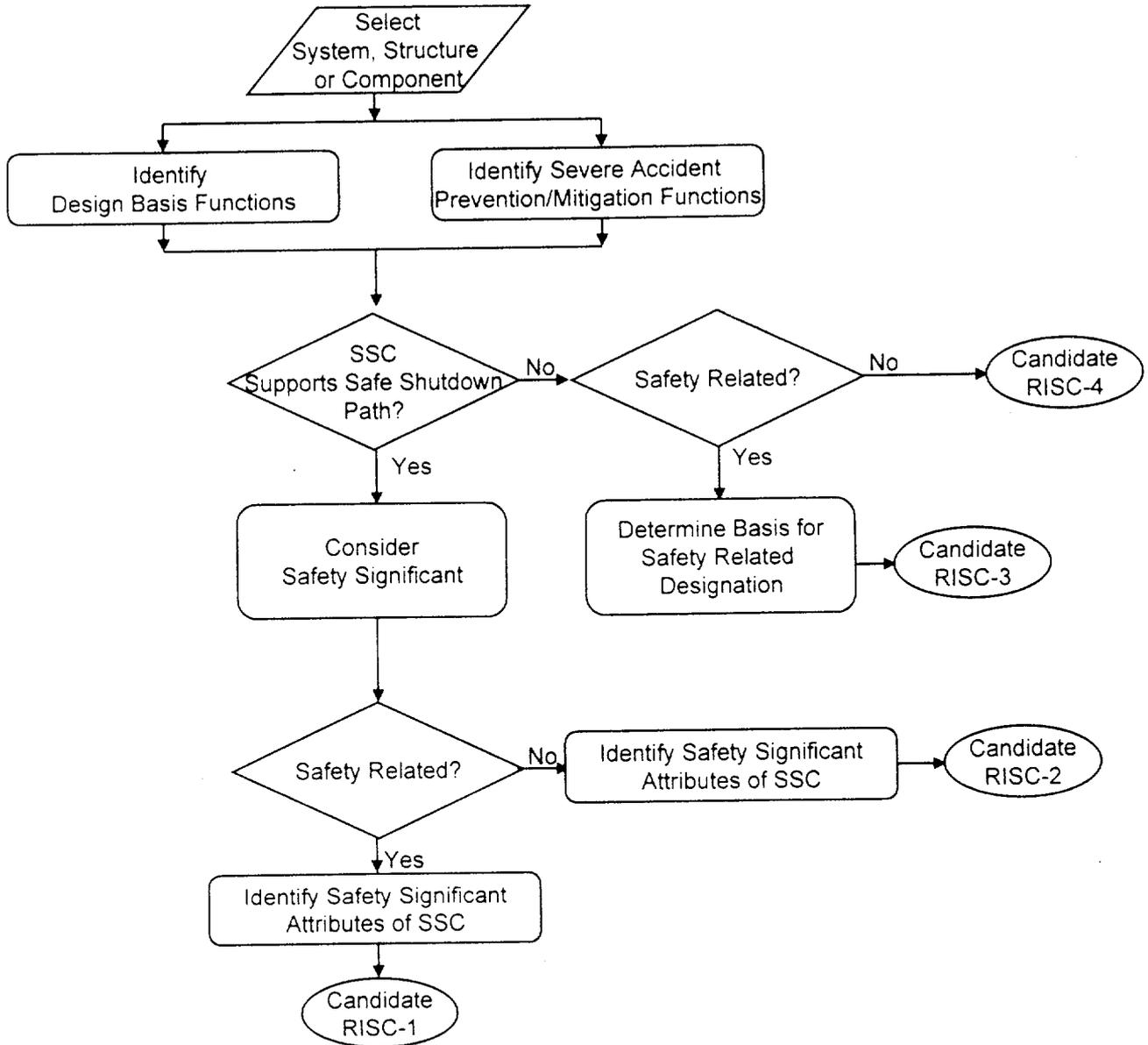


Figure 2.4-10
RISK IMPORTANCE PROCESS FOR COMPONENTS ADDRESSED IN
LOW POWER/SHUTDOWN PRAs

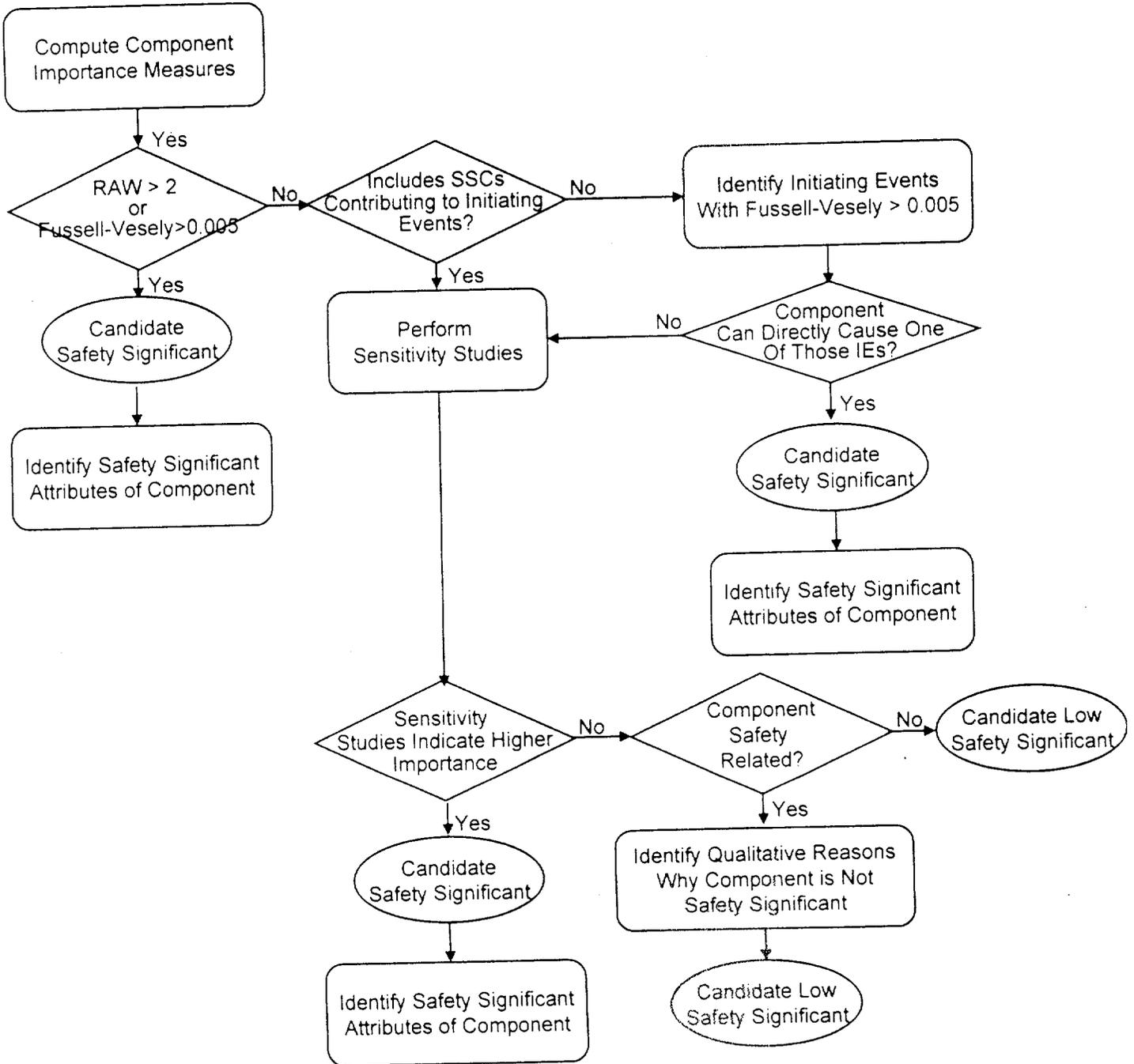
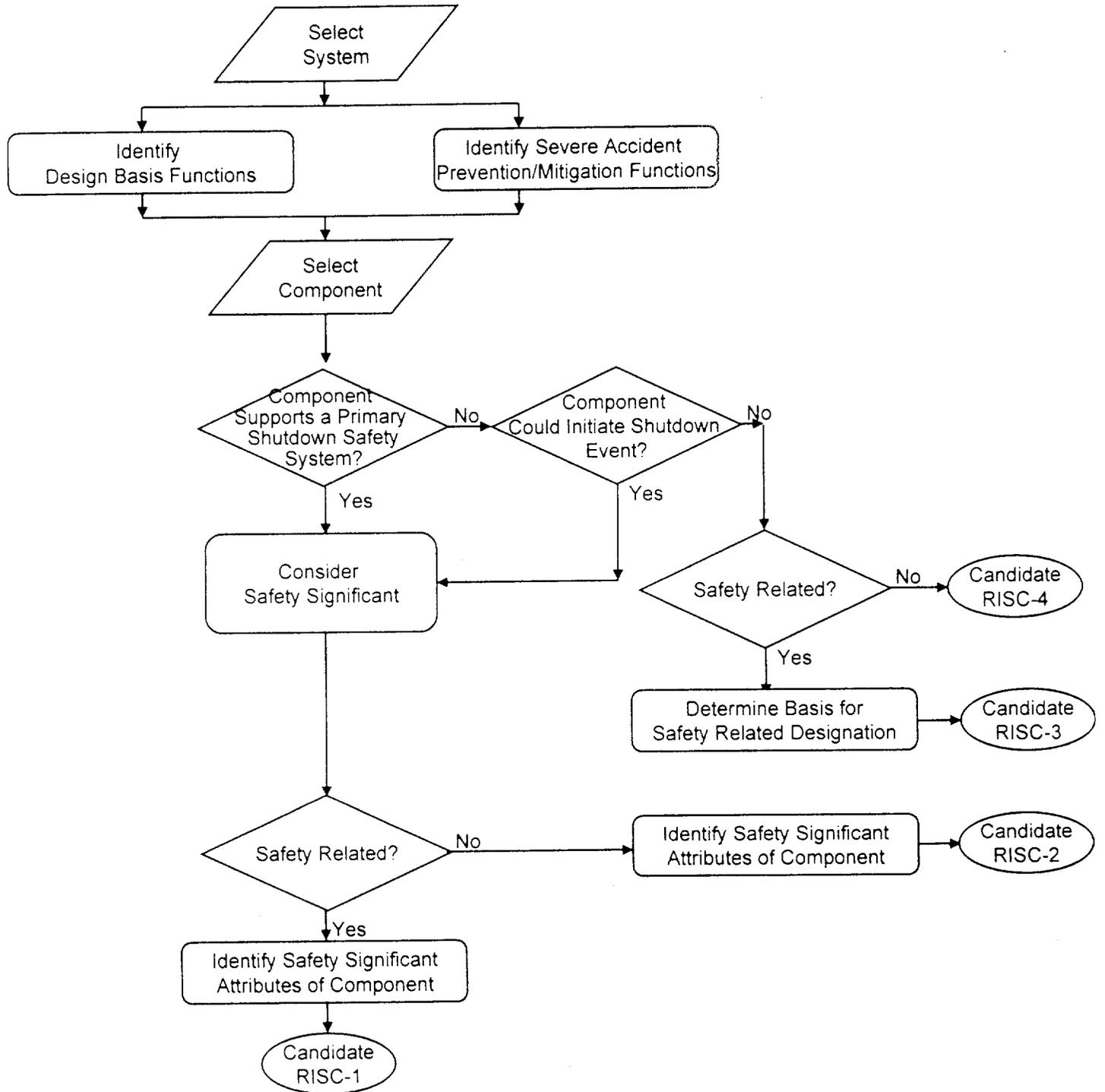


Figure 2.4-11
SAFETY SIGNIFICANCE PROCESS FOR
SYSTEMS AND COMPONENTS CREDITED IN NUMARC 91-06 PROGRAM



Risk-Informed Categorization

Safety-Related	Nonsafety-Related <i>(Includes ITS)</i>
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Risk-Informed SSC Categorization Methodology



Safety Significant	RISC-1	RISC-2
Not Categorized as Safety Significant	RISC-3	RISC-4

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Risk-Informed Safety Category - 1

Existing Safety-Related, Safety-Significant SSCs

- *Existing safety-related SSCs & safety-related attributes/functions*
 - No change, as per existing safety-related ~~requirements~~ requirements
- *Existing safety-related SSCs & new attributes/functions*
- For beyond design basis events
 - Inclusion in plant programs such as design and testing, to provide assurance of operation to satisfy assumptions in the risk-evaluation methodology

Risk-Informed Safety Category - 2

Existing Nonsafety-Related, Safety-Significant SSCs

- **NONSAFETY-RELATED SSCs**
- **ITS, SAFETY-SIGNIFICANT SSCs**
- *Subject to the maintenance rule, including its corrective action element, §50.65(a)(1)*
- *Assumptions and conclusions of the risk-informed SSC evaluation satisfied*
- *Reasonable commercial assurance standard -- commercial practices*
- *As necessary, assess environmental, seismic, or other attributes to provide a commercial level of assurance that the equipment would operate under the defined conditions*

Risk-Informed Safety Category - 3

Existing Safety-Related/ITS SSCs

NOT Categorized as Safety-Significant SSCs

- *For SSCs directly credited in the regulations*
 - *Monitoring or commercial controls and procedures*
 - *Maintenance rule performance thresholds are sufficient for monitoring, (system/train level)*
 - *Reasonable commercial assurance standard to satisfy the assumptions in the applicable regulations*
 - *Existing licensing commitments superceded by a commitment to monitor or adopt attribute controls (commercial standards)*
- *For SSCs directly credited in the regulations, cont'd*
 - *Environmental or seismic considerations based on commercial practices, vendor certification, design, testing or analyses*
 - *Not subject to NRC reporting requirements*
- *For other RISC - 3 SSCs*
 - *Commercial level programs*
 - *RISC-4 candidates*

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Risk-Informed Safety Category - 4

- SSCs not categorized as safety-significant and are nonsafety-related SSCs
- Not subject to NRC regulations
- Subject to new NRC oversight process
 - e.g., a failure of RISC - 4 SSC results in a unit trip
- Licensing commitments are no longer applicable
 - Adjust via Commitment Management Guideline

Pilots

- Funding targeted for BWR “systems pilot”
 - core spray (RISC 2) and feedwater (RISC 3)
 - define attributes, treatment
 - Consistent with industry guidance
- Other OG considering similar efforts



TREATMENT of RISC-2 and RISC-3 SSCs in a RISK-INFORMED PART 50

OBJECTIVE

Identify typical commercial standards or processes (e.g., design, procurement, qualification, quality assurance) that could be used to provide confidence that the functionality of RISC 2 and RISC 3 systems, structures and components (SSCs) will be maintained.

GENERAL APPROACH UNDER CONSIDERATION

- Identify the processes (e.g., design, procurement, qualification, quality assurance processes) that are affected by the special treatment rules
- Identify the principal attributes of the affected processes that are required by the special treatment rules, for example;
 - Independent design verification
 - Vendor audits
 - Seismic qualification by test or dynamic analysis
- Compare the process attributes required by the special treatment rules to those typically used in commercial engineering standards or practice
- Identify the commercial standards or process attributes that could be used to provide confidence that the functionality of RISC 2 and RISC 3 SSCs will be maintained.

ASME Presentation

For
RIP50 Meeting At White Flint
23 February 2000

By
C. W. Rowley, PE
Chairman, BNC&S TG on RIP50

ASME Disclaimer

- The following thoughts on RIP50 are just that.....thoughts, which have not been approved by the ASME technical consensus process
- The presenter has worked within the ASME nuclear codes and standards process for over 25 years, so he may be able to offer some ASME perspectives

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2

RIP50 Issues

- Risk-informed categorization process into HSSCs and LSSCs
- SSC scope
- Special treatment requirements for LSSCs

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3

RI Categorization (thought #1)

- ASME OMN-3 Code Case (for P&V IST)
- ASME N-560, -577, and -578 (for ISI)
- ASME OMN-10 Code Case (Snubber IST)
- 10 CFR 50 Appendix T (draft for Option 2)
- NEI Guideline (under development)

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4

RI Categorization (thought #2)

- Is the RI categorization process unique to certain "components"?
- Or can the RI categorization process be generic for all "components"?
- Can a generic RI categorization process be applied at the systems level (accepting that perhaps this may be conservative)?

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5

RI Categorization (thought #3)

- Each plant does have a PRA
- Some plant PRAs are "better" than others
- None of the PRAs are perfect
- Some components are not modeled
- Thus we need to blend the deterministic and the probabilistic information in the Expert Panel (integrated decision-making)

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6

RI Categorization (thought #4)

- Today our mechanism to perform RI categorization is the Expert Panel
- Thus we need “controls” on the Expert Panel integrated decision-making process
- Tomorrow, as we get our PRAs better and better, we will be able to rely more and more on the qualitative results of the PRA

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SSC Scope (thought #1)

- Safety related vs non-safety related
- SSCs important to safety
- ASME Code Class 1/2/3
- Active components vs pressure boundary

... in the past

- safety related
- important to safety
- safety significance

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SSC Scope (thought #2)

• <u>Number</u>	• <u>Description</u>
- ASME Code Class 1	- RCS pressure boundary
- ASME Code Class 2	- components in systems connected to RCS
- ASME Code Class 3	- systems that affect the function of RCS (e.g., cooling, aux FW, radioactive waste)

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SSC Scope (thought #3)

RISC-2 SSCs HSSCs / NSR	RISC-1 SSCs HSSCs / SR
RISC-4 SSCs LSSCs / NSR	RISC-3 SSCs LSSCs / SR

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Special Treatment Requirements for LSSCs (thought #1)

• System functionality	• Performance monitoring
• Component reliability	• Commercial practice

...where does formal corrective action fit?

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Special Treatment Requirements for LSSCs (thought #2)

- 10 CFR 50.65 (Maintenance Rule) is already providing a performance incentive for those systems “in scope”
- How do we handle seismic, fire, and environmental qualification of the LSSCs?
- What about 10 CFR 21 requirements relating to the dedication of commercial grade items to safety related service?

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Special Treatment Requirements for LSSCs (thought #3)

- Commercial practice still uses design codes
- Commercial practice has been quite ad hoc in the RRM area
- ASME Post Construction Committee are currently developing Repair, Testing, & Inspection Standards
- Commercial owner typically creates his PM program based on incentives.....plant safety, plant economics (predictive maintenance programs are widely used in non-nuclear industry)

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13

Special Treatment Requirements for LSSCs (thought #4)

- The nuclear industry is a maze of interwoven requirements
- For Option #2 we have no choice but to disentangle these interwoven requirements.
- That has already been done by ASME for IST and for ISI (part of Option #1 effort)
- ASME is now looking at design, RRM, QME, air & gas treatment, cranes.....

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14

Special Treatment Requirements for LSSCs (thought #5)

- 10 CFR 50 Appendix B provides for GQA
- Some plants have converted to the ASME NQA-1 Standard for their QA Program
- NQA-1 does provide for Graded QA
- Wonder if one of those NQA-1 plants should be one of our pilots in this area?

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15

Final Thought

- We created a sledgehammer approach to risk in the early days of nuclear power
- We have tacked on many deterministic (and prescriptive) band-aids over the years
- Option #3 is our opportunity to completely change our approach to risk
- Option #2 needs to be the bridge between the past and Option #3

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16