

***UCS Perspective on
Maintaining Enhanced
Safety for New Reactors***

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Reactor Risks: New vs. Old

- ***Based on average CDF, and considering external events and low-power and shutdown risks, the current reactor fleet is not safe enough today:***
 - ***Fleet-wide core damage risk: ~0.5 to 1% per year.***
- ***New reactors should be significantly safer if the size of the fleet is going to increase.***

A Question

- ***Has the 1986 Advanced Reactor Policy Statement inhibited significant safety improvements, as Commissioner Asselstine warned in his dissent?***
 - ***“I do not believe that this ... statement provides the sound regulatory basis to support a new generation of nuclear power plants in this country. The policy statement encourages, but does not require, safety improvements in advanced reactor design.”***

On the One Hand ...

- ***“CDF estimates for new reactors are typically 1 to 3 orders of magnitude lower than those for current designs when the contributions from external events that have been quantified ... are included.”***
- NRC Staff White Paper, February 12, 2009***

On the Other Hand ...

- ***“plants are required ... to develop PRAs ... which ... include internal events, fire, and external events including seismic ... the calculated risk metrics for new reactors are likely to increase and therefore be closer to current plants than being portrayed today. That is, the one to four orders of magnitude difference cited by the staff will decrease as other site-specific risk contributors, such as seismic, are more fully quantified.”***
- ***“Risk Metrics for Operating New Reactors,” NEI White Paper, March 27, 2009.***

Maintain Enhanced Safety

- ***It is not clear whether new designs now before the NRC really represent significant advances in safety ... but to the extent that they do, NRC should ensure that these advances will not be eroded over time. The public deserves better.***

Risk Metrics for New Reactors

- ***Risk-informed processes should***
 - ***Make sense and be useful for the intended application.***
 - ***Take into account all contributors to risk and all uncertainties.***
 - ***Ensure that risks to the public remain comparable to the risk profiles upon which the plants' approvals were based.***
- ***Corollary: If uncertainties are large, PRA is most useful in assessing relative, not absolute, risks.***

ROP

- ***The ROP is intended to provide timely indications of problems. We share the staff's concern that if the risk thresholds are too high compared to the CDF that the process will not be sensitive to significant declines in performance and will become ineffective.***
- ***Relative, not absolute, risk is the relevant parameter here.***

Risk-Informed LB Changes

- ***In an extreme scenario, maintaining current risk metrics for new reactors could allow some safety-significant systems to be taken out of service virtually forever.***
- ***NEI argues that “deterministic backstops” would prevent such absurd scenarios from taking place, eg. in RITS Initiative 4b.***
- ***But if the process drives all allowed outage times to deterministic backstops, this can hardly be called “risk-informed” regulation.***

UCS Preferred Option

- ***SECY-10-0121 identifies three options:***
 - ***Option 1: status quo***
 - ***Option 3: reduce risk guidelines for new reactors***
 - ***Option 2: keep thinking about it; develop application-specific changes***
- ***UCS generally supports Option 2***
 - ***Caveat: process must preserve new reactor safety enhancements; we believe that relative risk metrics will prove to make the most sense.***

Don't Rush the Process

- ***SECY-10-0121 says that a disadvantage of Option 2 is that the staff needs an answer soon to review risk-informed applications in current DCs and COLs (e.g. RITS for APWRs at Comanche Peak).***

Defer RITS for New Reactors

- ***The Commission should defer consideration of these requests for three reasons:***
 - 1. The analyses and pilot projects needed to develop sensible processes for new reactors will take time.***
 - 2. Risk-informed applications are not appropriate for new reactor designs that have not accumulated any operating experience to validate PRAs.***

Defer RITS for New Reactors

3. Risk evaluations should be based on the entire site-specific risk profile, including all external events and risks in modes other than full-power, where applicable. Ultimately, risk-informed processes should be based on full-scope, level 3 PRAs (see ACRS member Stetkar's comment).

Conclusions

- ***UCS supports Option 2 but believes it will ultimately look more like Option 3.***
- ***The staff's concern that Option 3 is inconsistent with the Advanced Reactor Policy Statement is misguided.***
- ***UCS opposes consideration of RITS for new reactors until***
 - ***A meaningful regulatory framework is in place.***
 - ***New reactor PRAs are sufficiently developed and validated.***

Acronyms

- ***ACRS: Advisory Committee on Reactor Safeguards***
- ***APWR: Advanced Pressurized Water Reactor***
- ***CDF: Core Damage Frequency***
- ***COL: Combined Operating License***
- ***DC: Design Certification***
- ***LB: Licensing Basis***

Acronyms (cont.)

- ***NEI: Nuclear Energy Institute***
- ***PRA: Probabilistic Risk Assessment***
- ***RITS: Risk-Informed Technical Specifications***
- ***ROP: Reactor Oversight Process***
- ***UCS: Union of Concerned Scientists***