

### **NRC Risk Informed Steering Committee (RISC)**

Since the advent of the Probabilistic Risk Assessment (PRA) Policy Statement in 1995, the NRC has steadily shifted from having purely deterministic regulatory processes to those which are risk-informed. A risk-informed process considers defense in depth and safety margins along with insights derived from quantitative PRA models. The PRA models, and by extension risk-informed decision making, approaches nuclear power plant safety from a holistic perspective as compared to the deterministic approach that is focused on certain prescribed events, components and actions. Over the years, several risk-informed licensing initiatives have been successfully undertaken: examples of these are risk-informed in-service inspection, risk-informed allowed outage times, risk-informed surveillance intervals, and the risk-informed, performance based voluntary initiative for fire protection (NFPA-805).

However, during the implementation of the risk-informed licensing actions, especially complex initiatives such as NFPA-805, issues arose demonstrating different perspectives exist between the stakeholders (the NRC, industry, and the public). In addition, there were a number of instances where the deterministic approach trumped risk-informed decisions although the risk insights suggested otherwise. Such challenges led to the formation of the current NRC Risk-Informed Steering Committee (RISC) in 2014 with a charter to:

- Establish strategic direction of staff activities aimed at more effective implementation of the Commission's PRA Policy Statement and Phased Approach to PRA Quality, and
- Develop and communicate a vision for future regulatory use of PRA including aspects not amenable to quantification through PRA (i.e., Security, Emergency Planning, Radiation Safety, and Environmental).

The NRC's RISC comprises of a senior management committee representing the NRC program offices (NRR, NRO, RES, NMSS, and NSIR as well as a senior executive from a regional office). The RISC is chaired by the NRR Office Director. The objectives of the RISC include:

- To engage industry and listen to concerns relative to the use of PRA to support regulatory decision-making,
- To communicate NRC actions in the area of risk-informed decision making,
- To discuss what initiative can be taken by the NRC to incentivize industry to continue to develop PRAs to help both reduce uncertainty and provide a framework to make decisions in light of inherent uncertainty in PRA models, and
- To discuss industry actions necessary to achieve the vision for future use of PRA to support regulatory decisions.

Recently, in response to comments from the Advisory Committee on Reactor Safety (ACRS) on SECY-15-0168 (ML15265A488), the NRC staff agreed with the ACRS's view that continued enhancements to the usage of risk-informed regulatory approaches should be pursued in future regulatory activities and stated that NRC activities in this and related areas will be overseen by NRC's RISC committee.

The NRC RISC regularly interfaces with its industry counterpart which comprises of licensee chief

nuclear officers, other senior level executives, and representation from the Nuclear Energy Institute (NEI).

At the time the RISC was formed, technical adequacy and uncertainties in risk-informed decision making were areas of concern and therefore, focus. Technical adequacy was viewed as a solution to some of the PRA quality issues that arose during reviews of complex risk-informed licensing applications. Uncertainties in risk-informed decision making resulted from the presence of various types of uncertainties in the PRA models, the impact of the uncertainties on the quantified results from the models, and the aggregation of risk metric, such as core damage frequency, contributions from different initiators used in the PRA models. Due to these concerns and focus areas, in 2014, the NRC and industry each agreed to form two working groups to focus on developing guidance in two selected areas related to PRA. The two areas of focus were “Technical Adequacy of PRA Methods” and “Treatment of Uncertainty in Risk-Informed Decision-Making”.

Under the Working Group (WG) on Treatment of Uncertainty in Risk-Informed Decision-Making, the focus is on the challenges involved in the more practical consideration of uncertainty in risk-informed processes that utilize PRA modeling results. Recent experiences indicate that practical applications can be hindered by: (a) different levels of detail and assumptions made in the development of the supporting PRA models, and (b) the lack of sufficient guidance to address important issues, including decision making in the presence of very large, irreducible uncertainties, and (c) the implications of the differentiated treatment of uncertainty when considering the risk profile from multiple hazards. The industry WG drafted a white paper that addressed the following topics:

- Identify the specific challenges for not being able to appropriately treat uncertainties in current risk-informed applications,
- Evaluate current approaches for addressing uncertainties in risk-informed decision-making applications and identify any gaps that need to be resolved,
- Propose enhancements to the existing framework for addressing the practical aspects of the treatment of uncertainty in risk-informed decision-making applications, and
- Identify potential education mechanisms (e.g., training, communications), for both PRA practitioners and broader audiences, with respect to the treatment of uncertainty.

The NRC’s WG on Treatment of Uncertainty in Risk-Informed Decision-Making held multiple public meetings with the industry WG to provide comments on the white paper and its recommendations.

In addition, NRC’ WG on Treatment of Uncertainty in Risk-Informed Decision-Making has held public meetings to seek stakeholder input on the update on NUREG-1855, “Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making”. As a result of the interaction at the public meetings, NRC is currently developing training related to the treatment of uncertainties in risk-informed decision-making which will be important to NRC staff and management as well as licensees.

The NRC’s regulatory position on PRA technical adequacy for licensing applications is documented in Regulatory Guide (RG) 1.200. However, the NRC and industry have expressed concerns regarding the sufficiency of the process for new methods, while the industry has encountered frustration when attempting to pursue innovative approaches. Therefore, a process for the use of new methods in risk-informed regulatory applications needs to be developed. In addition, there have been disagreements, in some cases, regarding the appropriate level of staff review of the PRA supporting the licensing applications. The peer review process currently laid out in RG 1.200 and supporting NRC and industry documents may need clarification and/or enhancement to realize the full value of the PRA standards and peer reviews, and to reduce unnecessary burden to licensees

and the NRC. The industry PRA Technical Adequacy WG has drafted a white paper that addressed the following objectives:

- Develop a process suitable for making new methods available for risk-informed regulatory applications,
- Improve the process for documentation and closure of the results of the peer review (termed Facts and Observations [F&Os]), and
- Evaluate any additional gaps in current peer review process.

The NRC's WG on PRA Technical Adequacy has held multiple public meetings to discuss the white paper and provide comments on the recommended actions. In addition, The NRC staff also observed an industry pilot project to implement the proposed approach and derive lessons learned for future discussions on the topic.

The NRC RISC engaged the industry in activities related to crediting FLEX/mitigating strategies (MS) equipment in risk-informed decision-making. The industry developed white papers and held a workshop for the same with good participation from both industry and the NRC. Overall it was agreed that the white papers were found to address a large number of issues that are important to the NRC staff in risk-informed decision-making. The industry revised the white papers based on NRC staff comments. The staff plans to update internal guidance for considering credited FLEX/MS equipment during the review of risk-informed licensing applications.

The RISC also directed the evaluation of the use of licensee PRA models in regulatory applications where SPAR models are currently being utilized. This evaluation was intended to evaluate the potential benefits, pitfalls, and cost of shifting to this approach. Ultimately, it was revealed that while there may have been some incremental cost savings after a full implementation period, the risk to the Agency of pursuing this initiative was too great to justify continued evaluation at this time.