

Summary of the 23rd Technical Advisory Committee (TAC) Meeting

Date: November 17(Monday)-20(Thursday), 2025

Place: Nuclear Risk Research Center (NRRC)
Central Research Institute of Electric Power Industry

Participants:

TAC: Mr. Stetkar (Chair), Mr. Afzali, Dr. Chokshi, Mr. Miraucourt, Dr. Takada, and Dr. Takata

NRRC: Dr. Apostolakis (Director), and
Research staff of the Nuclear Risk Research Center

Proceedings:

In the 23rd Technical Advisory Committee meeting, the following issues were reviewed:

- Level 2 PRA Case Studies *
- Guideline for Risk-Informed On-Line Maintenance (OLM) *
- Internal Flooding PRA Guide*
- Current Status of Industry Implementation of Risk-Informed Decision-Making (RIDM) Programs*
- Collection of Japanese Industry Equipment Failure Data and Quantification of Generic Equipment Failure Rates*
- Tsunami Hazard and Fragility Analysis Methods*
- Current Status and Plans for Tornado PRA*
- Project status overview: The Model Plant Seismic PRA Project
- Project status overview: PRA parameter development*

The following meeting was held as an open discussion (not disclosed to the public).

- Utilities' stance on handling the performance metrics for large release frequency of Cs-137*

Note: The meetings of the issues marked with an asterisk (*) were attended online by electric power companies.

Monday, November 17, 2025

Topic 1. Level 2 PRA Case Studies

TAC's advice and comments are as follows:

- It is desirable that the results of this study be provided in a format that is easily accessible for utilities in the future.
- The case studies should be developed for realistic scenarios, based on PRA results.
- The assumptions about open doors and unsealed penetrations between compartments are not consistent with actual plant practices. They result in unrealistic convective flows,

dispersal, and deposition throughout the building.

- The NRRC should consider an independent peer review of these methods.
- Selecting scenarios with high importance in actual evaluations leads to a Good Level 2 PRA.

Topic 2. Guideline for Risk-Informed On-Line Maintenance (OLM)

TAC's advice and comments are as follows:

- The guideline sets two screening criteria for implementing OLM: one criterion is CDF and CFF from combined internal event and external event PRA. A different criterion is used for CDF and CFF from only internal event PRA. Since decisions should be made based on total risk, the screening criteria appear to place excessive emphasis on internal events. If the proposed two-stage screening method is to be adopted, the purpose of setting these screening criteria should be clarified.
- While explicitly stating that success paths should be ensured against internal fires and internal flooding, the guideline provides no similar description for external hazards. So, consider implementing similar measures for external hazards as well.
- The OLM guideline should include all SSCs, as well as those managed by Technical Specifications, in the targets for testing, maintenance, and servicing.

Tuesday, November 18, 2025

Topic 3. Internal Flooding PRA Guide

TAC's advice and comments are as follows:

- Regarding the internal flooding PRA guide, it is important to conduct a pilot plant evaluation using the guide and obtain feedback.
- When implementing the pilot plant evaluation, it is also important to consider resource factors.
- It is desirable to discuss the consistency between the AESJ internal flooding PRA standard and the NRRC guide.

Topic 4. Current Status of Industry Implementation of Risk-Informed Decision-Making (RIDM) Programs

TAC's advice and comments are as follows:

- All the incentive activities promoted by the NRRC are passive. Passive activities are ineffective at actual power plant sites and offer little benefit for daily work. The NRRC should engage more proactively with the industry.
- The opportunity has arrived for the industry to accelerate the utilization of risk information. Drawing on the successful example of Risk-Informed In-Service Inspection (RI-ISI) in the United States, the NRRC should work to enable its early introduction in Japan as well.
- I believe risk information utilization can be applied to areas other than industry

applications, such as developing regulatory standards and review guides. I would like the NRRC to proceed with discussions with relevant parties to ensure the scope of utilization is not overly limited.

Topic 5. Collection of Japanese Industry Equipment Failure Data and Quantification of Generic Equipment Failure Rates

TAC's advice and comments are as follows:

- The NRRC suggests that the failure-on-demand model is preferable to the standby failure rate model because it provides higher failure probabilities and conservative results, but, in my view, that is incorrect. While that might be generally correct, it is not necessarily true when λ and t are large, particularly for equipment not covered by Technical Specifications.
- Higher failure probabilities by using the failure-on-demand model in industry would increase the CDF, which would not necessarily yield conservative results from a maintenance-rule perspective. Higher failure probabilities per cycle would increase margins to the performance criteria, leading to impractical performance monitoring of maintenance effectiveness.
- Both models are correct and are considered acceptable in peer reviews. This discussion requires careful consideration. I believe it is not the NRRC that should specify which approach to use for consistency throughout the industry. The industry should discuss and decide which model to standardize on.
- In my opinion, we should use the failure-on-demand model because it is more accurate, not because it is conservative. The standby failure rate model includes many assumptions. The failure-on-demand model involves fewer assumptions, which makes it more accurate. We should not state in the guide that the failure-on-demand model should be used because it is conservative.
- Component failures caused by human errors should not be classified as "component failures." It is inappropriate to justify including human-induced failures under "component failures" because of unfamiliarity with the HRA methodology. Since corrective actions differ between component failures and human errors, they should be classified separately to aid decision-makers in utilizing the equipment performance information in future risk-informed programs.

Wednesday, November 19, 2025

Topic 6. Tsunami Hazard and Fragility Analysis Methods

TAC's advice and comments are as follows:

- I will send the NRRC comments explaining the reasons for the significant changes in the CDF due to grade transitions in the graded approach for tsunami PRA. The treatment of uncertainty and the use of different inundation thresholds for specific analysis grades have

a very significant impact on the CDF. It is necessary to proceed with the research, recognizing that the guidance and assumptions for evaluating uncertainties are very important.

Topic 7. Current Status and Plans for Tornado PRA

TAC's advice and comments are as follows:

- The guidance should use CFF as the screening metric, rather than CDF.
- If conservative assessments are employed in hazard screening and related fields, the guidance should include explanations of these conservatisms.
- The NRRC methods and guidance for external hazard PRA should be developed consistently with the basic framework in the internal flooding and internal fire PRA guides.

Topic 8. Project status overview: The Model Plant Seismic PRA Project

TAC's advice and comments are as follows:

- To confirm consistency between the Seismic PRA guideline and the other PRA guidelines by NRRC, we would like to review an outline or framework of the guideline at an early stage.

Topic 9. Project status overview: PRA parameter development

TAC's advice and comments are as follows:

- The scope of unavailability data is the same as that of component failure data.
- The assessment of LOOP (loss-of-offsite power) event characteristics, such as whether they are long-term or short-term, or whether recovery should be considered, should ensure no overlap with other external causes, like high winds.

Thursday, November 20, 2025

Exit Meeting [Closed]