Summary of the 22nd Technical Advisory Committee (TAC) Meeting

Date: May 19(Monday)-22(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 22nd Technical Advisory Committee meetings, the following issues were reviewed:

- Internal Flooding PRA Guide*
- Overview of the NRRC Research Plan for FY2026: RIDM Promotion
- Overview of the NRRC Research Plan for FY2026: Risk Assessment Research
- Overview of the NRRC Research Plan for FY2026: External Natural Event Research
- Current Status of Model Plant Seismic PRA Project*
- Guideline for Risk-Informed Online Maintenance (OLM)*
- Guidelines for Risk-Informed Containment Vessel Leak Rate Testing (CV-LRT)*

The following meetings were held as open discussions.

- Updated information about opinion exchange regarding risk information utilization with NRA*
- Current Status of Industry Implementation of Risk-Informed Decision-Making (RIDM) Programs*

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

Monday, May 19, 2025

Topic 1. Internal Flooding PRA Guide

TAC's advice and comments are as follows:

- The NRRC should develop guidance to address internal flooding events induced by external hazards, such as earthquakes.
- The Guide needs feedback on the overall analysis process from implementing the overall tasks at a pilot plant project.

Topic 2. Overview of the NRRC Research Plan for FY2026 -RIDM Promotion-

TAC's advice and comments are as follows:

- The RIDM Team should proactively determine the priorities of the projects and take the lead in promoting the RIDM by highlighting its benefits.
- Securing reviewers is particularly important to establish PRA peer review systems for both the utilities and the NRA.
- The NRRC does not have to specify an applicable capability category (CC) for each supporting requirement in the ASME/ANS standard for specific risk-informed applications. The basic requirement is to satisfy CC-II. If a utility claims that meeting CC-I is sufficient, the utility has the responsibility to demonstrate that their analyses are technically adequate for the specific application.

Topic 3. Overview of the NRRC Research Plan for FY2026 -Risk Assessment Research-

TAC's advice and comments are as follows:

Human Reliability Analysis (HRA)

- The HRA research project should include developing the HRA method of handling commission errors for internal flooding PRA and shutdown PRA.
- The Phoenix methodology is not currently used in PRAs in the U.S. The NRRC research team should understand the methodology. However, it is not necessarily better than the methods in the current NRRC guidance, simply because it is new.

Level 2 PRA

- When utilities implement online maintenance or interval expansion of containment vessel leak rate tests, this level 2 PRA research should be helpful to meet the NRA's "performance objectives" for the release frequency of Cs137.
- The study of the SFP PRA should include scenarios for not just low-power and shutdown mode but also at-power mode in its scope of research.

Level 3 PRA

- If the interface tool for Level 2 PRA and Level 3 PRA is generally usable, it would be better to stop improving details of the tool and develop a method for analyzing the propagation of uncertainty from Level 2 PRA to Level 3 PRA.

Multi-hazard PRA

- Not only seismic-induced tsunamis but also seismic-induced fires and seismic-induced floods should be considered as seismic-induced events.

Tuesday, May 20, 2025

Topic 4. Overview of the NRRC Research Plan for FY2026 -External Natural Event Research-

TAC's advice and comments are as follows:

Seismic PRA

- While common to all research themes, the goal is to develop guidelines. Please establish milestones for the "drafting of NRRC seismic PRA guidelines" indicated in the 2026 research plan.
- As for the assessment of seismic-induced hazards, it seems that the response to utilities' needs is currently insufficient. Given the discussions in the TAC on seismic-induced fires and internal flooding, the priority of this issue is high, and we should consider how to systematically address multiple hazards.

Tsunami PRA

- The tsunami PRA model plant study at Hamaoka was completed several years ago, but if an expert review of the report has been conducted, please provide details.

Tornado and High-Wind PRA

- In the BEPU (Best Estimate Plus Uncertainty) evaluation of the tornado hazard, we would like clarification on how the uncertainties in the data are considered.

Volcanic ash-fall PRA

- When volcanic ash-fall PRA is to be evaluated using a model plant, we would like to see the results.
- During volcanic ash-fall events, not only the total amount of ash-fall but also filter clogging by volcanic ash particles must be considered, making the duration of volcanic ash-fall a critical factor. Since distribution data of volcanic ash-fall only provides its total amount, its duration is subject to uncertainty. Although refining the estimation of ash-fall duration seems to be difficult, we would like to know the direction of the research.

Topic 5. Current Status of Model Plant Seismic PRA Project

TAC's advice and comments are as follows:

- NRRC should examine simpler methods to evaluate partial correlations, such as using empirical data and rule of thumb. Those methods should support the application of the Reed-McCann method.

Topic 6. Guideline for Risk-Informed Online Maintenance (OLM)

TAC's advice and comments are as follows:

- The example diagram of quantitative screening criteria for the Cs-137 release frequency is adapted from the EPRI PSA Applications Guide, which is outdated. It should not be used

in the OLM Guideline.

- The provisional performance objective for the release frequency of Cs-137 exceeding 100 TBq is relevant to not only OLM but also the entire RIDM. The industry needs to dialogue with the NRA about how to address this issue.
- The OLM Guideline should include the requirement to meet the performance objective of Cs-137 release frequency exceeding 100 TBq. However, it should not describe how to do it.

Wednesday, May 21, 2025

Topic 7. Guidelines for Risk-Informed Containment Vessel Leak Rate Testing (CV-LRT)

TAC's advice and comments are as follows:

- The NRRC should consider the trial implementation of the CVLRT methodology. Through the trials that assess all the tasks listed in the guidelines using the actual plants, the feasibility of extending the test intervals, namely, the validity or adequacy of the methods, can be confirmed.

Thursday, May 22, 2025

Exit Meeting [Closed]