

## Summary of the 18th Technical Advisory Committee (TAC) Meeting

**Date:** May 15(Monday)-19(Friday), 2023  
**Place:** Nuclear Risk Research Center (NRRC),  
Central Research Institute of Electric Power Industry and Webex  
**Participants:**  
**TAC:** Mr. Stetkar (Chair), Mr. Afzali, Dr. Chokshi, Mr. Miraucourt,  
Dr. Takada, Dr. Yamaguchi  
**NRRC:** Dr. Apostolakis (Director),  
Research staff of the Nuclear Risk Research Center

### Proceedings:

In the 18th Technical Advisory Committee meetings, the following issues were reviewed:

- “Overview of NRRC Research Plan for FY2024 –Risk-informed Decision-making (RIDM) Promotion–”
- “Overview of NRRC Research Plan for FY2024 –Risk Assessment Research–”
- “Overview of NRRC Research Plan for FY2024 –External Natural Event Research–”
- “Good Practice of RIDM” \*
- “Draft Guidelines for Containment Vessel Leak Rate Test” \*
- “Draft Guidelines for On-Line Maintenance” \*
- “PSHA Implementation Guidelines”
- “MUPRA research overview - Research plan and current outcomes-” \*
- “Multi-Hazard PRA (Seismic-Tsunami superposition PRA)”

The following meeting was held closed.

- “Research Initiatives on Risk Integration”

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

### Monday, May 15, 2023

#### Topic 1 Overview of NRRC Research Plan for FY2024 –RIDM Promotion–

The NRRC presented the overview of the FY2024 Research Plan for “RIDM Promotion.” TAC’s advice and comments are as follows.

- The RIDM promotion team should develop methodology and guidance for the utilities to utilize PRA to make good decisions.
- To get PRA peer review experience, official peer reviews are not necessary and trial ones are useful enough. Peer review hands-on experience gives two benefits. The first is training experienced reviewers. The second is to give feedback to Japanese utilities about

the current technical quality of PRAs and make them identify areas of improvement in PRAs.

### **Topic 2 Overview NRRC Research Plan for FY2024 –Risk Assessment Research–**

The NRRC presented the overview of the FY2024 Research Plan for “Risk Assessment Research.” TAC’s advice and comments are as follows.

- **SFP PRA**

- SFP PRA should be intended to be a method for Level 1 and Level 2 for all plant operating modes. The research plan should explicitly describe that the Level 2 PRA methodology for SFP will be established considering the plant operating status not only at low power and shutdown but also at full power.

- **Fire PRA**

- There is no need to develop a new methodology for Level 2 Fire PRA since there is no methodological difference between Level 1 and Level 2 of Fire PRAs in general.

### **Topic 3. Overview NRRC Research Plan for FY2024 –External Natural Event Research–**

The NRRC presented the overview of the FY2024 Research Plan for “External Natural Event Research.” TAC’s advice and comments are as follows.

- **Seismic PRA**

- The phase of conducting seismic PRA for a model plant has already been completed. The next step is the phase of that evaluation for an actual plant, which should be conducted by the utilities. The NRRC should upgrade the assessment methodology of hazard and fragility.

(NRRC) The NRRC will compile methodologies applicable to seismic PRA of actual plants conducted by the utilities.

(NRRC) We are discussing how to evaluate the capacity of buildings against vertical loads according to the TAC letter of last November. Based on the request by utilities, we are also considering cooperating in the development of elastoplastic 3D models for back fitting in the future.

- **Tsunami PRA**

- The reference tsunami heights and the reference earthquake ground motions are conservative. The NRRC should accelerate before it is too late the implementation of the application of rational design in new plant planning, which is one of the long-term goals.
- TAC would like the NRRC to provide the paper on a graded approach to tsunami fragility assessment.

(NRRC) Since this is a major theme that cuts across different fields, we will consider an implementation system for discussions within not only the NRRC but also the Federation of Electric Power Companies of Japan.

- Tornado and High-Wind PRA**

- Tornadoes and typhoons have common issues in the development of PRA methodology; therefore, they should be studied concurrently.

- Volcanic ash-fall PRA**

- The paper on the formulation of the ash-fall hazard curve is quite interesting.

**Tuesday, May 16, 2023**

**Topic 4 RIDM Team Activities**

The NRRC presented “Good Practices for RIDM,” “Draft Guidelines for Containment Vessel Leak Rate Test,” “RIDM activities by the utilities,” and “Draft Guidelines for On-Line Maintenance”. TAC’s advice and comments are as follows.

- Good Practice for RIDM**

- The NRRC should continue to consider using the common list of good practice attributes as bases for consistent evaluation among the utilities.

(NRRC) The NRRC would like TAC to recommend some U.S. utilities for benchmarking daily RIDM activities.

- Draft Guidelines for Containment Vessel Leak Rate Test**

- The estimation of the containment standby failure rate should not use the total industry exposure times.
- To improve accountability to the regulator, all hazards and all modes should be considered in risk assessment.

(NRRC) The NRRC will add guidance to CRIEPI study report about the consideration of uncertainties and PRA scope with reference to RG1.174 and NUREG-1855 and ideas for LRT test interval extension application.

- Draft Guidelines for On-Line Maintenance**

- Aggregating the total risk for the whole year is necessary because the sum of the risks can be unacceptable for OLMs of multiple facilities or multiple times even if each activity is within AOT for a short period of time.
- Since plant operation varies depending on the scope of the isolation of the systems, the risk assessment should consider not only the outage of the target equipment but also the impact of the outage.
- The increase of the initiating event frequencies caused by OLM is addressed by multiplying the frequencies by rough coefficient factors or using initiating event fault trees.

(NRRC) The fixed version of the Guidelines for On-Line Maintenance will be circulated to TAC members.

**Wednesday, May 17, 2023**

**Topic 5 PSHA Implementation Guide**

The NRRC presented the outline of the CRIEPI report on the Probabilistic Seismic Hazard

Analysis (PSHA) Implementation Guide and the research progress on Multi-Site SSHAC-Based PSHA Development. TAC asked questions about the coordination of the PSHA Implementation Guide with the Atomic Energy Society of Japan Seismic PRA Standard and the way to demonstrate the efficiency of Multi-Site SSHAC/PSHA.

**Topic 6 MUPRA research overview-Research plan and current outcomes-**

The NRRC presented the Research plan and current outcomes of MUPRA. TAC's advice and comments are as follows.

- The NRRC needs to exercise caution not to screen out or simplify important scenarios in level 2 MUPRA only based on the results of level 1 MUPRA.
- The NRRC needs to provide a big picture of the MUPRA study, considering factors such as POS, PRA level, and so on.
- The NRRC should avoid using words that may imply the need for new methodologies when your objective is not to develop a methodology.

**Topic 7 Multi-Hazard PRA (Seismic-Tsunami superposition PRA)-**

The NRRC presented the Research plan and current outcomes of MUPRA. TAC's advice and comments are as follows.

- The NRRC should carefully note in the final report that identified superposition events are for a hypothetical plant along a coast.

**Thursday, May 18, 2023**

**Exit Meeting [Closed]**