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Director

December 27, 2022

Mr. J.W. Stetkar, Chairman
Technical Advisory Committee

Subject: TAC Report titled "PROPOSED NRRC RESEARCH PLAN FOR FISCAL YEAR
2023" dated November 27, 2022

Dear Chairman Stetkar:

We appreciated the interactions with TAC throughout the review of our research plan and the Committee's insights. The NRRC reply to the TAC conclusions and recommendations is as follows.

1. Research plan for fiscal year 2023

In the subject report, the Committee stated, "The overall scope of research for fiscal year 2023 and the technical objectives of the individual projects within each major research area remain consistent with the NRRC short-, intermediate-, and long-term goals."

We are gratified to receive this comment.

2. Recommendations for individual research activities in the Discussion section

With regard to the five recommendations for the individual research activities, we will reconsider the plans for fiscal year 2023 and beyond for those research activities. Details are as follows.

Research Assessments

(1) Level 2 PRA Model Plant Study

We would like to proceed with this study as planned. This study is a partial re-implementation of the tsunami Level 2 PRA with source term evaluation for Hamaoka Unit 4. In this study, we

will incorporate new findings from the L2PRA study, including various fission products (FP) transfer models and containment failure frequency (CFF) calculations using the phenomenological relationship diagram (PRD). The effectiveness of each model will be clarified by the difference between before and after application. In particular, the effectiveness of the pool scrubbing model will be clarified by the tsunami PRA. Therefore, we believe that the recalculation of the tsunami L2PRA for Hamaoka Unit 4, which has already been conducted, is optimal. We also believe that the findings from this study would be practical modeling insights. We will compile these findings into a guidance document describing how to use the above models and methods to be provided to the utilities. Note that this study should have been called a case study, not a model plant evaluation.

(2) Seismic PRA Model Plant Study

As is already planned and explained in the previous TAC held in May, we have just launched a Phase-2 project to enhance Seismic PRA methodology using a BWR model plant, which starts in FY2022 and ends in FY2024. Therefore, we recognize that the comment from the TAC points out the R&D plan in the next phase which will start in FY2025 and end in FY2027.

We think that we need to share the progress of the Seismic PRA R&Ds and discuss with both BWR and PWR utilities because it is necessary for NRRC to exchange information and work closely from the viewpoint of NRRC's outputs implementation into Seismic PRA conducted by utilities.

We concur that there do not exist gaps to be overcome inherent to PWR in a case where we focus on only reactor type. In Phase-2, we plan to make a draft implementation guide regarding Seismic PRA, which includes the outputs of the Phase-2 also, so that utilities can utilize it; we believe that we need to discuss this issue with utilities. Moreover, in order to promote RIDM against external natural events in Japan, we think that it is necessary to continue enhancing and optimizing the Seismic PRA methodology. On the basis of comments addressed in the letter, we would like to continue to carry out more in-depth discussions regarding R&D plans with both PWR and BWR utilities.

(3) Detailed Analyses of Structural Failure Modes

The partial damage of a building itself can bring about scenarios related or unrelated to critical events. And we agree that the PRA without consideration of both scenarios about a partial damage is incomplete. For a more realistic PRA, we are going to arrange the entire scenario under cooperation with utilities. Based on the arranged scenarios, we clarify evaluation contents for the bifurcation and select an analysis method or develop it if necessary.

As for adding the scenario in PRA where "a building has damage partially, but it doesn't directly

lead to core damage", two items of evaluation are necessary, that is, (a) the state of the building and (b) the influence on internal safety-related SSC. Evaluation contents and analysis methods must be determined for each of these. Finite element model under development is corresponding to (a) and an analysis method for (b) is necessary to be investigated hereafter considering whether bifurcation is possible or not.

Research Extensions

(1) Spent Fuel Risk Assessment

As mentioned in our response to the TAC letter for the FY2022 research plan, we have started a survey in FY2022 on the current status of low power and shutdown risk assessment methods and practices, including those overseas. Based on your comments and the results of this survey, we will organize the technologies to be researched and developed for risk assessment during low power and shutdown. In the development study of SFP PRA model in and after FY2023, we will take into account the plant conditions during at-power, low power and shutdown related to SFP.

(2) Risk Integration

We accept TAC's comment and will start the activity from FY2023 to investigate how to develop a risk integration methodology. We would like to discuss this issue more with TAC next May to understand it better, and we would very much appreciate it if we can have further inputs from TAC.

Sincerely,

A handwritten signature in blue ink, appearing to read "George Apostolakis", is written over a light blue rectangular background.

George Apostolakis