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January 26, 2022

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

Subject: TAC Report titled "PROPOSED NRRC RESEARCH PLAN FOR FISCAL YEAR
2022" dated December 30, 2021

Dear Chairman Stetkar:

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

1. Research plan for fiscal year 2022

"We did not identify any major gaps in the overall technical research plan for fiscal year 2022."
We are gratified to receive this comment.

2. Multi-Hazard Probabilistic Risk Assessment (MHPRA), methods and models for evaluation of the risk from seismically-induced tsunamis

"We fully support the start of a new research project for Multi-Hazard Probabilistic Risk Assessment (MHPRA)."

Thank you for this comment. We will steadily pursue our research to develop an evaluation method for tsunamis caused by earthquakes.

3. Recommendations for specific activities in the Discussion section

With regard to the six recommendations for the specific research activities, we will reconsider the plans for fiscal year 2022 and beyond for those research activities. Details are as follows.

(1) The "model plant" approach and an integrated full-scope PRA

“From our purely technical point of view, we continue to strongly recommend that the research teams should use those PRAs instead of the "model plant" approach.”

As mentioned in our response to the committee's letter on the FY2021 research plan, the NRRC's goal is to build an integrated full-scope PRA methodology that covers all hazards and all modes, and we fully understand that the pilot plant PRAs of Ikata Unit 3 and Kashiwazaki-Kariwa Unit 7 are ideal for this purpose. However, for natural external hazards, it should be more appropriate to use plants other than Ikata and Kashiwazaki-Kariwa depending on the geographical conditions. In addition, using a single plant for different hazard multiple projects would impose a heavy burden on the owner utility company, and the interference between the projects could hinder efficient implementation. We would like to formulate a research plan based on these practical considerations and the committee's recommendations.

(2) Priorities and resource allocation by an integrated risk-informed perspective

“In summary, the priorities and resources for further enhancements to specific analytical methods, models, and tools should be determined from an integrated risk-informed perspective. That perspective should consider how the specific technical issue and the proposed enhancements affect an understanding of Level 1 and Level 2 risk from all hazards and all plant operating modes, including the associated uncertainties.”

When planning further enhancements to specific analytical methods, models, and tools, we will determine the priorities and resource allocation based on the prior consideration of the impact on Level 1 and Level 2 risks, including uncertainty.

(3) Low Power and Shutdown Modes: A survey and technical assessment of LPSD PRA

“To better understand the current status of LPSD risk assessment methods and practices, we recommend that the NRRC research plan for fiscal year 2022 should include a formal survey and structured high-level technical assessment of each utility's LPSD PRA.”

In FY2022, we will start a survey of the current status of the utilities' LPSD risk assessment methods and practices.

(4) Spent Fuel: Integration of the analyses of spent fuel risk with the PRA models for all modes

“As part of their reviews of international spent fuel risk assessment experience in fiscal year 2022, the research team should also examine methods and practices that are used to integrate the analyses of spent fuel risk with the PRA models for full-power, low power, and shutdown

modes.”

For the development of future risk assessment methodologies and integrated assessment guidance for SFPs, we will survey and analyze existing methodologies and experiences in risk assessment for SFPs integrating full power, low power, and shutdown modes.

(5) Superposed Hazards

“The research project should demonstrate how the PRA models are structured to provide a comprehensive and integrated assessment of the risk from earthquakes and tsunamis. It should also demonstrate how the models are structured logically to avoid "double counting" for some risk contributors.”

In the new research project on multi-hazards that we started in FY2021, we will try to make sure that the PRA model can provide a comprehensive and integrated assessment of the risk from earthquakes and tsunamis, taking care to avoid "double counting" for some risk contributors as the committee warns.

(6) Volcanic Ash-Fall: Combined PRA models to illustrate the overall risk from an extended eruption

“... the demonstration should use the combined PRA models for full-power operation and shutdown modes to illustrate how the overall risk from an extended eruption is evaluated.”

The effect of extended volcanic ash-fall on NPPs will be considered through combined PRA models for full-power operation and shutdown modes. Duration of ash-fall at the NPP will be analyzed based on the duration of large, explosive eruptions and the meteorological statistics around Japan. In recent years, a few volcanic ash-fall events in South America are known to have affected the generation or the transmission systems for several months. Therefore, we will continue to pay attention to the new developments in analytical methodologies for the effect of extended volcanic ash-fall to the various systems.

Sincerely,



George Apostolakis