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Head

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

Subject: TAC Report titled "PROPOSED NRRC RESEARCH PLAN FOR FISCAL YEAR  
2021" dated February 16, 2021

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 recommendations is as follows.

**1. Research plan for fiscal year 2021**

In the subject report, the Committee stated: "We did not identify any major gaps in the overall technical research plan for fiscal year 2021." We are gratified to receive this comment.

**2. Treatment of uncertainties prior to the development of detailed analytical tools**

In developing risk assessment methods, we will identify and evaluate aleatory and epistemic uncertainties of the hazards and phenomena which are the source of the risk in advance. Then, important factors will be dealt with in the risk assessment method.

**3. Inclusion of currently-available methods and models in the pilot plant PRAs**

There is no doubt that building an integrated PRA model that supports all hazards and all modes for one plant is an ideal situation that NRRC should aim for. However, regarding a natural external hazard, it may be more appropriate to use a plant different from Ikata and/or KK depending on the geographical conditions. In addition, conducting research on multiple hazards at the same plant imposes a heavy burden on the owner power company, and there is a risk that the research activities will interfere with each other and take much time. We will

make a research plan based on these practical requirements and considering the TAC recommendation.

#### **4. Recommendations for specific activities in the Discussion section**

With regard to four recommendations for specific research activities, we will reconsider the plans for fiscal year 2021 and beyond for those research activities. Details are as follows:

##### **(1) Scope of Multi-Unit PRA Research**

From JFY 2021, we will carry out a review of the literature and make a research plan on multi-unit Level 2 PRA. And, from JFY 2022, we will start research on the construction of MUPRA methods, including the development of Level 2 PRA. In addition, we have been conducting research related to the seismic Level 1 MUPRA model so far. Studies to demonstrate the applicability of this method will be continued so that it can be utilized at Level 2.

##### **(2) Methods and Models for Evaluating the Risk from Seismically-Caused Tsunamis**

NRRC has conducted studies which aim at developing methods of hazard and fragility evaluations in a case where combinations of earthquake and seismic-induced tsunamis impacts are considered.

NRRC is planning a model plant research beginning in fiscal year 2021 to develop an integrated methodology of Level 1 and Level 2 PRA considering combinations of earthquake and seismic-induced tsunamis.

##### **(3) Evaluation of Volcanic Ash-Fall Contribution to Loss of Offsite Power**

We follow the recommendation and first develop the volcanic ash-fall PRA model on nuclear power plant systems. We may subsequently add sub-models to improve the analysis. We consider the probability for the loss of offsite power to be a candidate for additional sub-model in the future.

##### **(4) PRA Peer Review Guidance and Implementation**

Currently, we are requesting reviews from overseas experts only, but we expect that domestic PRA engineers will eventually join the reviewers. We recognize that this requires training for domestic PRA engineers. In order to make plans for training, we are investigating the status of PRA engineers (number of people, experience, etc.) of utilities, engineering subsidiaries, and plant vendor involved in the development of good PRA models, review the plans of each plant (estimated implementation time) assumed by each utility, and so on. Based on these results,

we will consider how to develop a specific peer review training program.

Sincerely,

A handwritten signature in blue ink, appearing to read "George Apostolakis". The signature is fluid and cursive, with a long horizontal stroke at the end.

George Apostolakis