

Technical Advisory Committee of the Nuclear Risk Research Center
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SUBJECT: PROPOSED NRRC RESEARCH PLAN FOR FISCAL YEAR 2018

Dear Dr. Apostolakis:

During the eighth meeting of the Technical Advisory Committee (TAC) of the Nuclear Risk Research Center (NRRC), November 6-10, 2017, we met with the NRRC staff to review the proposed research plan for fiscal year 2018. The purpose of our review was to provide comments on the technical merit of the research plan and its relevance for supporting NRRC's current mission.

CONCLUSION

We did not identify any major research gaps that require attention in the plan for fiscal year 2018.

BACKGROUND

One of the most important objectives of the research plan is to present the technical context of the research needs including the proposed rationale, current state of knowledge, and potential contributions and significance of the research to the objectives of the center. Our review of the research plan focused on the objectives of each research task, understanding the relative priorities and relationships among those tasks, and identifying any major needs for additional research. We did not review the technical details of individual research activities or their completion milestones, except as needed to understand how those activities are integrated throughout the plan. We will comment separately on the technical elements of individual research projects in our detailed reviews of those projects.

DISCUSSION

The Risk Assessment Working Group (WG1) and the External Natural Event Working Group (WG2) presented the research and development (R&D) plans in

each of their areas. Broadly speaking, the scope of WG1 activities covers a wide range of issues related to Level 1, Level 2, and Level 3 probabilistic risk assessments (PRAs) and some important supporting technologies, such as human reliability analysis, methods for analyzing internal fires and floods, and risk communications. The WG2 activities include research related to external hazards, such as seismic events, localized fault displacement, tsunamis, extreme weather, and volcanic hazards.

The presentations described the overall framework of the research to support various NRRRC objectives and goals, such as providing support for nuclear power plant restart activities and enhancing risk assessment methods for use in risk-informed decision-making. The presentations discussed potential gaps that are being addressed and the major components of the research to address those gaps (e.g., development of databases based on Japanese experience for WG1, and development of probabilistic hazard analysis and fragility methods for WG2). The research timelines and schedules were also included to demonstrate how the short-, intermediate-, and long-term goals are being met. The presentations were very useful for an understanding of the scope of the various NRRRC activities. They also provided clear context for how the detailed activities in specific areas fit into the overall research scheme. This overview provides a comprehensive understanding that will help us to have more effective discussions with the NRRRC and provide more useful feedback on specific topics, as well as identification of research needs for correlated topics.

We did not identify any major research gaps that require attention in the plan for fiscal year 2018.

Considerations for Future Reviews

Based on our discussions with the NRRRC research team, we offer the following considerations that will improve communications and mutual understanding of how NRRRC research plans address the organization of research tasks and justification of priorities.

A successful R&D program must be clearly aligned with the overall organizational goals and ensure coherence among the components of the research. Also, practical R&D programs cannot be designed to address all conceivable issues or to address each issue in the same level of detail. Therefore, there are always difficult trade-offs. To demonstrate how the research program achieves these goals, it is essential to define clear outcome objectives for each R&D activity to:

- (1) Align each outcome objective to a major organizational goal (e.g., NRRRC's short-term goal to support nuclear power plant restarts and NRRRC's longer-term goal to support development of high-quality full-scope PRAs for all nuclear power plants).

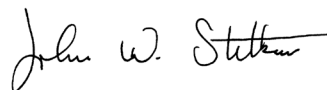
- (2) Improve coherence¹ between different activities (e.g., use of the same fundamental risk assessment methods and models to quantify risk from all hazards).

Thus, the overall research plan should include the following major attributes:

- **Alignment:** The research plan needs to have a strategy that is fully aligned with the broader NRRC goals, is not focused too narrowly on individual topics, and accounts for the practical constraints within which the organization operates.
- **Coherence:** The NRRC's stakeholders have a variety of objectives, with a correspondingly complex set of near-, intermediate-, and long-term needs. The NRRC is embarking on a set of research activities that will eventually support the development of high-quality full-scope PRAs to support risk-informed decision-making. Coherence in the methods, models, data, and guidance developed through this research will provide assurance that those objectives can be achieved in a technically integrated manner.

These attributes will then support effective planning, execution, and review of the R&D program to ensure that the infrastructure (i.e., programs, tools, processes, personnel, and training) and associated priorities are adequately considered to meet the stated outcome objectives.

Sincerely,



John W. Stetkar
Chairman

REFERENCES

1. "R&D Plan for FY 2018, Risk Assessment Research," Presentation to NRRC Technical Advisory Committee, November 7, 2017, Proprietary.
2. "Development of the Fire PRA Guide," Presentation to NRRC Technical Advisory Committee, November 7, 2017, Proprietary.
3. "Study on MUPRA [Multi-Unit PRA]," Presentation to NRRC Technical Advisory Committee, November 7, 2017, Proprietary.
4. "R&D Plan for FY 2018, External Natural Event Research," Presentation to NRRC Technical Advisory Committee, November 8, 2017, Proprietary.

¹ In this letter, we use the term "coherence" to mean the quality of being logical and consistent to form an integrated risk assessment.

5. "PTHA [Probabilistic Tsunami Hazard Analysis] and TFA [Tsunami Fragility Analysis] in Tsunami PRA," Presentation to NRRC Technical Advisory Committee, November 8, 2017, Proprietary.
6. "Technical Issues to be Studied in Ikata SSHAC Level 3 Project," Presentation to NRRC Technical Advisory Committee, November 8, 2017, Proprietary.
7. Nuclear Risk Research Center (NRRC), Central Research Institute of Electric Power Industry (CRIEPI), "Fire PRA Guide, Volume 1," Draft Chapter 1, Chapter 2, and Appendix A, October 2017, Proprietary.