

August 17, 2015

MEMORANDUM TO: Brian W. Sheron, Director  
Office of Nuclear Regulatory Research

FROM: William M. Dean, Director **/RA by MEvans for/**  
Office of Nuclear Reactor Regulation

SUBJECT: USER NEED REQUEST FOR OFFICE OF NUCLEAR  
REGULATORY RESEARCH DEVELOPMENT OF APPENDIX FOR  
REVISED NUREG/BR-0058 ON SEVERE ACCIDENT  
CONSEQUENCE ANALYSIS

The Office of Nuclear Reactor Regulation (NRR) requests that the Office of Nuclear Regulatory Research (RES) develop an appendix to the revised NUREG/BR-0058 "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission." The purpose of this document is to provide guidance to staff developing regulatory analyses and supporting technical bases, to promote preparation of high quality regulatory decision-making documents. The appendix that RES is requested to develop will provide information and guidance on tools and methods used to conduct severe accident consequence analyses. It should incorporate any information from NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook," on the use of probabilistic risk assessments (PRA) and offsite consequence estimates that continues to be relevant to the current state of practice. In addition, this appendix should provide updated information about the MELCOR Accident Consequence Code System (MACCS) including: (1) a discussion of recent upgrades to the code's atmospheric transport and dispersion and economic consequences models; (2) an updated discussion of the current state of practice in parameter estimation; and (3) an updated discussion of the current state of practice with regard to the treatment of uncertainty for severe accident consequence analyses. The guidance should reflect U.S. Nuclear Regulatory Commission (NRC) experience and improvements in data and methodology since the 1997 NUREG/BR-0184 was released, and identify best practices and those references essential for conducting high quality severe accident consequence analyses.

NRR staff has ranked this user need request as a high priority to be completed in a timely manner as outlined in the delivery and schedule sections of this memorandum. My staff has discussed the priority level with members of your staff to determine whether your office can support our schedule requirements. These discussions indicate that RES should be able support the scope and proposed schedule. RES staff estimates approximately 0.5 full-time equivalent total.

CONTACT: R. Fred Schofer, NRR/DPR  
301-415-5682

### 1. Technical Issue

The accident at the Fukushima Dai-ichi nuclear power plant in Japan raised questions regarding how the NRC's regulatory framework considers offsite property damage and the associated economic consequences caused by a significant radiological release from an NRC-licensed facility. In response to these questions, on August 14, 2012, the staff issued SECY-12-0110, "Consideration of Economic Consequences within the U.S. Nuclear Regulatory Commission's Regulatory Framework" for Commission consideration. The purpose of SECY-12-0110 was to provide the Commission with information and options to address the extent, if any, that the NRC's regulatory framework should be modified when addressing the economic consequences of an unintended significant release of licensed radioactive materials to the environment. In development of SECY-12-0110, the staff examined areas of the regulatory framework and the associated guidance and tools that consider economic consequences and identified potential changes to the framework.

In the staff requirements memorandum (SRM)-SECY-12-0110 dated March 20, 2013, the Commission approved the staff's plan for enhancing the currency and consistency of the existing framework through updates to cost-benefit guidance documents. The Commission also directed the staff to identify the potential changes to current methodologies and tools that would enhance the regulatory analysis framework in a paper describing the staff's plan for updating cost-benefit guidance. In response to this direction, on January 2, 2014, the staff issued SECY-14-0002, "Plan for Updating the U.S. Nuclear Regulatory Commission's Cost-Benefit Guidance."

As part of Phase I of this plan, the staff is restructuring the three main cost-benefit guidance documents. Information in NUREG/BR-0184 and NUREG-1409, "Backfitting Guidelines," will be updated and captured in a series of appendices to NUREG/BR-0058. This structure will provide a single point of reference as well as allow staff to update, as needed, individual volumes or appendices.

### 2. Regulatory Application

The resulting appendix will be incorporated into the revised NUREG/BR-0058 and provide guidance to NRC cost-benefit analysts and supporting technical subject matter experts to promote the preparation of quality cost-benefit analysis documents. As practices change over time, the new appendix could be updated without revising the remainder of the guidance document.

### 3. Deliverables

NRR requests the development of an appendix that will provide information and guidance on the conduct of severe accident consequence analyses for use in cost-benefit analyses. Specific topics to be covered in this appendix will include: (1) Overview of MELCOR and MACCS codes, (2) Frequency Weighting and PRA, (3) Atmospheric Transport and Dispersion Modeling, and (4) Economic Modeling.

The scope and deliverables of this effort should include the following tasks:

Task 1: Evaluate the contents of NUREG/BR-0058 and NUREG/BR-0184 and decide what information should be carried forward and what should be revised.

Task 2: Evaluate post-Fukushima Regulatory Analyses to assess what is the current state of practice for doing regulatory analyses. This will include review of the following analyses:

- A. Filtered Vents (SECY-12-0157)
- B. Expedited Transfer of Spent Fuel (SECY-13-0112)
- C. Mitigation of Beyond-Design Basis Events (SECY-15-0065)
- D. Containment Performance and Release Reduction for BWRs with Mark I and II Containments (SECY-15-0085)

Task 3: Assess gaps between current state of practice and what is captured in existing regulatory guidelines (NUREG/BR-0058 Rev. 4 and 1997 NUREG/BR-0184).

- A. Identify updated sources of plant information.
- B. Review recommendations contained in GAO audit report, "Nuclear Regulatory Commission: NRC Needs to Improve its Cost Estimates by Incorporating More Best Practices" (GAO-15-98) (Agencywide Document Access and Management System (ADAMS) Accession No. ML14351A082) and in the Office of the Inspector General report, "Audit of NRC's Regulatory Analysis Process" (OIG-15-A-15) (ADAMS Accession No. ML15175A344) on NRC's regulatory analysis process.
- C. Review other NRC and Federal agency guidance documents as additional sources of information. Documents to consider are the NUREG/CR-7009, "MACCS2 Best Practices as Applied in the SOARCA Project" and the U.S. Environmental Protection Agency "Protective Action Guides and Planning Guidance for Radiological Incidents (PAG Manual)."
- D. Refer to the NUREG under development for MACCS input parameter guidance, RES response to User Need NRO-2014-002.
- E. Refer to the NUREG under development that summarizes insights and lessons learned from the SOARCA Uncertainty Analyses.

Task 4: Finish developing the MACCS alternative economic consequence model that is GDP-based and closer to the economic community state-of-the-art, and develop guidance on the use of MACCS legacy and alternative economic consequence models.

Task 5: Develop draft appendix based on the results of Tasks 1-4.

Task 6: Provide a revised appendix ready for public comment based on feedback from NRR and other program office staff as relevant. Interim written reports should be provided to NRR at the conclusion of tasks 1-4, followed by the delivery of the draft appendix at the conclusion of task 5, and the final deliverable at the conclusion of task 6.

4. Schedule

This user need request was coordinated with RES staff in the Division of Systems Analysis' Accident Analysis Branch, and the staff is in agreement with the approach. We expect that the requested work should be completed within an 18-month timeframe, with a start date of October 1<sup>st</sup>, 2015.

5. Priority

This user need request is considered high priority based on the timeline for updating cost-benefit guidance presented in SECY-14-0002. The NRR staff has used this priority value in discussions with members of your staff to determine whether your office can support our schedule requirements. These discussions indicate that RES can support the scope and proposed schedule without displacing other user need requests. If this should change, we request early notification of any impact on the RES work for NRR.

6. Points of Contact

It is important that the staff in NRR and RES communicate frequently to assure the efforts related to this request meet the identified needs and schedules. To achieve these purposes, the technical monitors have agreed to meet monthly. To this end, we have designated Fred Schofer of NRR/DPR as the NRR technical contact should you have any questions or comments.

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