



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 24, 2017

Dr. Dennis C. Bley, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: DRAFT SAFETY EVALUATION OF PWROG-14001-P, REVISION 1, "PRA
MODEL FOR THE GENERATION III WESTINGHOUSE SHUTDOWN SEAL"

Dear Dr. Bley:

I am responding to your letter dated June 19, 2017 (Agencywide Documents Access and Management System Accession No. ML17166A374), in which the Advisory Committee on Reactor Safeguards (ACRS or the Committee) provided its recommendations concerning the draft safety evaluation report (SER) for Topical Report PWROG-14001-P, Revision 1, "PRA Model for the Generation III Westinghouse Shutdown Seal." In your letter, you indicated that the Committee recommends that the SER should be issued after addressing two specific recommendations. The results of the U.S. Nuclear Regulatory Commission (NRC) staff's evaluation of these two recommendations (recommendations 4 and 6) follows.

ACRS Recommendation 4

The safety evaluation should state explicitly that the hourly failure rates derived from the Bayesian analyses are appropriate for use in all applications of the proposed models, but unavailability estimates derived from a nominal 24-hour mission time apply only for evaluations that use those specific success criteria.

Staff Response to ACRS Recommendation 4

The NRC staff agrees with the Committee's recommendation that the hourly failure rates derived from the Bayesian analyses are appropriate for use in the proposed models. Therefore, the NRC staff has revised the SER to state that the licensee should incorporate the failure modes in the probabilistic risk assessment (PRA) with the corresponding hourly failure rates.

ACRS Recommendation 6

The staff should re-examine the quantitative bases for the [Pressurized-Water Reactor Owners' Group (PWROG)] conclusion that inadvertent actuation of the shutdown seal can be omitted from the PRA models.

Staff Response to ACRS Recommendation 6

The NRC staff has re-examined the quantitative bases for the PWROG conclusion that inadvertent actuation of the shutdown seal can be omitted from the PRA models. In conducting the examination, the NRC staff reassessed the expert elicitation guidance in NUREG/CR-6771,

“GSI-191: The Impact of Debris Induced Loss of ECCS Recirculation on PWR Core Damage Frequency,” and the associated references for developing the approximate numerical failure probabilities. In addition, the NRC staff performed sensitivity studies to analyze the questions raised by the ACRS about the use of lower numeric estimates (i.e., 1E-3 and 1E-4) and the use of annual frequencies of occurrence for certain activities related to seal manufacture, assembly, or installation.

These sensitivity studies support the conclusion that the failure probability is sufficiently small and can be excluded in accordance with the provisions in ASME/ANS RA-Sa-2009, “Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications.”

The NRC staff also revised the SER text to clarify that the inadvertent actuation fault tree provided by the applicant (and the corresponding sensitivity studies) contain useful information, but do not form the sole basis for the staff’s decision. To inform the staff’s decision, the NRC staff used an integrated process that considered both quantitative information provided by the applicant and traditional engineering considerations such as the results of acceptance testing, qualification testing, and design features meant to prevent inadvertent actuation.

The NRC staff has reasonable confidence that the probability of inadvertent actuation is sufficiently low compared to other dominant failure modes (i.e., fail to seal, fail to remain sealed, seal bypass). However, as part of the performance monitoring strategies stated in the Limitations and Conditions section of the SER, licensees adopting the topical report will be required to inspect the shutdown seal for inadvertent actuation upon replacement. Any inadvertent actuation identified during this inspection must be reported to the NRC within 60 days.

The NRC staff appreciates the Committee’s feedback on this important SER.

Sincerely,

/RA/

Victor M. McCree
Executive Director
for Operations

cc: Chairman Svinicki
Commissioner Baran
Commissioner Burns
SECY

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