

July 20, 2001

MEMORANDUM TO: Chairman Meserve
Commissioner Dicus
Commissioner McGaffigan
Commissioner Merrifield

FROM: William D. Travers */RA/*
Executive Director for Operations

SUBJECT: RESPONSE TO SRM - M010510B
BRIEFING ON OFFICE OF NUCLEAR REGULATORY
RESEARCH (RES) PROGRAMS AND PERFORMANCE

On May 10, 2001, the Commission was briefed by representatives of the Advisory Committee on Reactor Safeguards (ACRS), members of the expert panel reviewing RES programs, and the NRC staff on research programs and performance at the NRC. The resulting staff requirements memorandum (SRM) dated May 24, 2001, requested specific feedback from the staff on areas where they disagreed with the ACRS' recommendations of research activities that should be closed and reasons for continuing those lines of research.

The ACRS report, NUREG-1635, Vol.4, "Review and Evaluation of the Nuclear Regulatory Commission Safety Research Program," included a number of recommendations for new or expanded research activities as well as recommendations for research activities that should be closed. Although the report was not received in time to fully inform the RES FY 2003 budget process, interactions with the ACRS during its reviews did influence the RES budget. Furthermore, a number of the recommendations in the report were consistent with previously planned RES activities and were already included in RES' FY 2002-FY 2004 budget submittal. However, there were a number of other recommendations for new or expanded research that were not included in the RES budget submittal.

With respect to those areas identified for closure, the ACRS recommended closure of the work in the control room design review guidance, the Organization for Economic Cooperation and Development (OECD) lower head failure research program, the common cause failure program, and the ATHEANA program. The staff agrees with the first two recommendations from the ACRS to phase out these activities and they have already been reflected in RES budget submittal. This memorandum, as requested by the Commission, addresses the following ACRS recommendations for closure with which the staff disagrees, in part, and the reasons for continuing those research activities.

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ACRS recommendation: "The NRC has completed a comprehensive study of common-cause failures....The current program is one of maintaining and updating databases....The ACRS believes that this program has served its regulatory purpose, and that the work can be brought to an orderly close." (p.12)

- Staff response: The staff agrees with this ACRS recommendation, in part. We believe that the data classification and quantification methodology that we have developed is sufficient to estimate the risk implications of common-cause failure (CCF) events for risk-informed regulatory applications. We recognize the decreasing trend in the occurrence rate of CCF events. After the current set of CCF insights reports are completed, CCF methodology work and insights reports will be terminated in FY2002. A small effort is budgeted to continue participation in the International Common-Cause Failure Data Exchange Program (ICDE) and we will continue to collect data, including CCF, as part of the routine operating experience evaluation.

ACRS recommendation: "The ACRS has been told that ATHEANA will be applied to the human performance aspects of the Pressurized Thermal Shock program now under way at the agency." "The ACRS concludes that the greatest achievement of the work to date is to sensitize people to the concept of error-forcing context. The ACRS, therefore, recommends terminating the ATHEANA effort, and developing a new plan to quantify the probability of unsafe human acts." (P.21)

- Staff response: The staff agrees with this ACRS recommendation, in part. In FY 2001 and FY 2002, the staff is continuing to implement improvements in ATHEANA to reflect ACRS comments provided in their December 15, 1999, letter. This work will be completed in FY 2002. After FY 2002, the staff will sunset the development of ATHEANA. However, given the appropriateness of the error forcing context (EFC) concept and the expected improvements in quantification, we believe that continued application of ATHEANA is appropriate. The staff believes that the ATHEANA distinction between the likelihood of the EFC and the conditional probability of the unsafe act, given the EFC, is appropriate for any human reliability analysis (HRA) method that seeks to develop improved estimates of the likelihood of unsafe acts. This concept provides a clear link to the overall PRA, is used by other advanced HRA methods, and has been recognized by the ACRS as being important. We believe that any HRA quantification approach we develop should employ this concept. For example, the staff is applying ATHEANA to a number of problems such as pressurized thermal shock [PTS], steam generator tube rupture, fire, and cable aging. The staff also proposes to implement the draft HRA research plan (which has a task on HRA quantification and uncertainty designed explicitly to address the concerns of ACRS and others in this area).

In addition to the above closure recommendations, the ACRS was concerned with cost effectiveness of the decommissioning research and thermal hydraulic research test facilities. Regarding decommissioning research, the ACRS recommended that broader consideration be given to a risk-informed approach to the assessment of public exposure to environmental releases from site decommissioning. Licensees have been provided several modeling tools to select from in demonstrating compliance with the license termination rule. The staff believes that this approach to the decommissioning environmental release issue is cost effective and consistent with broad application of risk-informed regulation because the choice of modeling tools allows the application of the most appropriate models for their specific sites and avoid

unnecessary cleanups. Regarding thermal hydraulic test facilities, the ACRS recommended that the staff evaluate the tradeoffs between the existing Purdue University Multidimensional Integral Test Assembly (PUMA) and a better facility, and to better justify the needs for the Oregon State University Integral Test Facility. We have evaluated these test facilities and concluded that they are cost effective in satisfying current NRC needs in thermal hydraulics and that it would be more practical to modify or upgrade existing test facilities than to develop new and better facilities to deal with new reactor designs and future NRC needs.

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