



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

July 15, 2005

The Honorable Nils J. Diaz
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: ASSESSMENT OF THE QUALITY OF THE NRC RESEARCH PROJECTS

Dear Chairman Diaz:

In its April 25, 2005 Staff Requirements Memorandum, the Commission requested the ACRS to "provide the Commission a list of research projects it intends to review in the short term as part of its assessment of research quality, with an indication of the methodology the Committee will use for the reviews." This report responds to this Commission request.

Throughout its history, an essential activity of the ACRS has been reviewing the research sponsored by the NRC. Currently, we conduct review of research in four ways:

- Review of research conducted in support of specific regulatory activities
- Episodic review of particularly important ongoing research
- Biennial review of the technical and programmatic aspects of the overall reactor safety research program
- Review of the quality of selected research projects

Our assessments of supporting research and episodic review of significant ongoing research are discussed in individual reports. Our biennial review of the overall reactor safety research program is provided in a report to the Commission (successive volumes of NUREG-1635).

We have recently undertaken the in-depth assessment of the quality of selected research projects in response to a request from the Director of the Office of Nuclear Regulatory Research (RES). The Director requested us to do these reviews to meet the requirement of the Government Performance and Results Act (GPRA) that there be an independent quality review of Government-sponsored research. This independent review is required to include quantitative assessments so that research sponsors can demonstrate improvements in research quality over the years. We have undertaken this review in partial fulfillment of the role we assumed when we replaced the Nuclear Safety Research Review Committee as directed by the Commission.

During fiscal year (FY) 2004, we conducted a trial review of the quality of selected research projects. Based on the outcomes of this trial review, we have established the following review process:

- RES submits to us a list of research projects that are candidates for review because they have reached sufficient maturity that meaningful technical review can be conducted.
- We select a maximum of four projects for detailed review in the fiscal year.
- A panel of three ACRS members is established to assess the quality of each research project.
- The panel follows the guidance developed by the ACRS full Committee in conducting the technical review. This guidance is discussed further below.
- Each panel assesses the quality of the assigned research project and presents an oral and a written report to the ACRS full Committee for review. This review is to ensure uniformity in the evaluations by the various panels.
- The Committee revises these reports and provides them promptly to the cognizant research manager, as appropriate.
- The Committee submits an annual summary report to the RES Director.

The definition of quality research we have adopted includes two major characteristics:

- Results meet the objectives
- Documentation of research results and methods is adequate

The first of these major characteristics is weighted 75% in the scoring of the work. The documentation characteristic is weighted 25%. The measures and associated weights within the first characteristic are:

- Justification of major assumptions (12%)
- Soundness of technical approach and results (52%)
- Uncertainties and sensitivities addressed (11%)

The measures and weights within the general category of documentation are:

- Clarity of presentation (16%)
- Identification of major assumptions (9%)

These measures and associated weights for assessing the quality of research projects were defined by the ACRS full Committee and are addressed explicitly in the reports of the review panels. Scoring is based on a 10-point scale. A score of five is assigned to sound, professional performance of research. Exceptional performance is required to raise scores above this standard. Identifiable deficiencies must be cited to justify lower scores.

In our FY 2004 trial review, we assessed the quality of the following research projects:

- Effects of chemical reactions on head loss in debris beds that may block sump screens
- Experimental studies of loss-of-coolant accident generated debris accumulation and head loss on sump screens
- Improvements to the MACCS computer code, plume model adequacy

We submitted a summary report of our review of these research projects to the RES Director on November 18, 2004.

During FY 2005, we are assessing the quality of the research projects associated with:

- Standardized Plant Analysis Risk (SPAR) model development program
- Thermal-hydraulic experiments at the Pennsylvania State University
- Steam generator tube integrity research being performed at the Argonne National Laboratory

A fourth research project on reactor containment performance being conducted at Sandia National Laboratories will be evaluated later in the year, once a particularly pivotal report on the research becomes available. We plan to submit a summary report on our quality review of three research projects to the RES Director in the fall of 2005.

Sincerely,

/RA/

Graham B. Wallis
Chairman

References:

1. U.S. Nuclear Regulatory Commission, "Staff Requirements Memorandum (SRM), April 7, 2005 Meeting with the Advisory Committee on Reactor Safeguards (ACRS)," April 25, 2005.
2. Letter dated November 18, 2004, from Mario V. Bonaca, Chairman, ACRS, to Carl J. Paperiello, Director, Office of Nuclear Regulatory Research, NRC, Subject: ACRS Assessment of the Quality of Selected NRC Research Projects.