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

ACRSR-2242

March 22, 2007

The Honorable Dale E. Klein
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: DEVELOPMENT OF THE TRACE THERMAL-HYDRAULIC SYSTEM ANALYSIS CODE

Dear Chairman Klein:

During the 540th meeting of the Advisory Committee on Reactor Safeguards (ACRS), March 8-9, 2007, we completed our report on the development of the TRACE thermal-hydraulic (T/H) system analysis code. We also discussed this matter during our 539th meeting, February 1-3, 2007. Our Thermal-Hydraulic Phenomena Subcommittee discussed this matter on December 5, 2006. During these reviews, we had the benefit of discussions with representatives of the NRC staff and its contractors. We also had the benefit of the document referenced.

RECOMMENDATIONS

1. The schedule for documenting, validating, and peer reviewing TRACE should be accelerated and the work completed expeditiously.

2. The development of a representative set of TRACE plant models and user testing on applications should also be accelerated to facilitate timely incorporation of TRACE into the regulatory process.

BACKGROUND AND DISCUSSION

In the mid-1990s, the Office of Nuclear Regulatory Research, working with the Office of Nuclear Reactor Regulation, determined that the four primary reactor system T/H codes that were in use at that time should be consolidated into one code. These codes included RELAP5 (LOCA), TRAC-P(PWR-LOCA), TRAC-B(BWR LOCA), and RAMONA (BWR Stability).

The models, correlations, and solution methodologies in these codes did not reflect the state-of-the-art and required in-depth review and modification. It was also recognized that they had been designed at a time when computer capabilities were limited and included many structural aspects, such as memory management, that were no longer needed and increased the cost of code maintenance and development. The availability of graphical user interfaces and their wide acceptance also suggested the desirability of incorporating similar capability in NRC codes. All these considerations led to extensive code consolidation, model improvements, and implementation efforts culminating in the development of TRACE .

TRACE is intended to serve as the main tool for confirmatory analyses of a broad range of thermal-hydraulic problems for current and future reactor designs. It has the potential to offer significantly enhanced capabilities for state-of-the-art analyses of thermal-hydraulic issues. Applications include certification of new reactor designs and the regulatory review of power uprates for currently operating reactors. Therefore, the schedule for documenting, validating, and peer reviewing TRACE, as well as the development of plant input decks, should be accelerated. The work should be completed expeditiously to enable the incorporation of the code into the regulatory process.

Sincerely,

/RA/

William J. Shack
Chairman

Reference:

1. Memorandum from Farouk Eltawila, Director, Division of Risk Assessment and Special Projects, Office of Nuclear Regulatory Research, to Frank Gillespie, Executive Director, ACRS, “TRACE V5.0 Documentation and Support”, January 31, 2007

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