October 7, 2010

Dr. Said Abdel-Khalik, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: RESPONSE TO ADVISORY COMMITTEE ON REACTOR SAFEGUARDS LETTER ON CLOSURE OF DESIGN ACCEPTANCE CRITERIA FOR NEW REACTORS

Dear Dr. Abdel-Khalik:

In your letter dated August 9, 2010, you summarized the views of the Advisory Committee on Reactor Safeguards (ACRS or the Committee) on the staff's approach to the closure of design acceptance criteria (DAC) for new reactors. The staff of the U.S. Nuclear Regulatory Commission (NRC) is committed to working closely and cooperatively with the Committee to resolve the concerns presented in the ACRS letter.

Your August 9, 2010, letter included the conclusions and recommendations given below, for which the staff has provided associated responses. In addition, the staff identified a number of concerns in your letter with respect to the use of DAC. These issues are summarized below and discussed in detail in the enclosure.

ACRS Recommendation No. 1

DAC closure requires expertise, judgment, and interpretation. It should be performed by NRC staff experts with an independent assessment by the ACRS.

NRC Response

The staff agrees that DAC closure requires expert judgment. The staff also agrees that subject matter experts with experience in the area covered by the DAC should perform the inspection of activities for verification of DAC closure.

The staff recognized the need to develop a strategy and process for DAC inspections and formed the DAC Task Working Group in November 2009 to address this issue. Consistent with the Committee's recommendation, the DAC Task Working Group developed a strategy that calls for a combination of qualified inspectors and appropriate technical experts to conduct the inspection of DAC activities. The DAC Task Working Group envisioned that qualified inspectors with the right level of expertise and technical background would lead the DAC inspection efforts with the support of qualified agency personnel. The DAC Task Working Group has demonstrated the viability of this approach within the framework of the ongoing effort to conduct digital instrumentation and control (DI&C) DAC inspections of the South Texas Project during the combined license (COL) review. Among other things, the South Texas Project DI&C DAC inspection effort affords the staff an opportunity to gauge the effectiveness of using technical

staff in an inspection role. Based on early results from the June 2010 inspection, given the proper guidance with respect to inspection scope and an adequate inspection procedure, the staff found that using a combination of qualified inspectors and appropriate agency technical experts yielded optimum inspection results. The staff intends to continue using qualified technical personnel in this manner for DAC inspection.

The DAC Task Working Group is developing the procedures for inspecting DAC activities. The staff expects to brief the Committee on the strategy and specific procedures for DI&C DAC in early 2011, after the procedures are submitted to the ACRS. The staff values ACRS input and looks forward to future discussions on this matter.

Regarding the Committee's recommendation that ACRS independently assess DAC closure, the staff believes that the Committee's review would be most beneficial in the context of ensuring a robust inspection program for DAC. The staff believes that a discussion of the inspection strategy, ACRS review of inspection procedures, and ACRS assessment of the first implementation of these procedures should provide the Committee with the necessary information to judge and comment on the staff's approach. In this context, the staff asks the Committee to consider the option of reviewing the first implementation of the DAC inspection program as a way to assess the staff's approach for inspection of DAC closure in lieu of ACRS review of all future DAC inspections.

The staff believes that the above approach is consistent with the historical role of ACRS in reviewing the staff's inspection activities associated with issuance of operating licenses. In addition, this approach would maintain a clear role for ACRS in licensing. The staff notes that an independent review of DAC closure by the ACRS would represent a departure from the ACRS's usual review process. If the Commission were to determine such an approach to be beneficial, the staff would work with the ACRS to determine the nature and timing of any ACRS review of the COL holder's implementation of DAC and the staff's oversight and inspection of DAC implementation as well as any linkage between an ACRS review and the Commission's determination under Title 10 of the *Code of Federal Regulations*, Part 52, Section 52.103(g).

ACRS Recommendation No. 2

It is preferable that all DAC be resolved no later than the COL stage. However, whether resolved as part of the COL process or post-COL, proper closure of DAC requires a consistent scope and depth of evaluation in accord with our first recommendation.

NRC Response

The staff agrees that it is preferable to close the DAC as early as possible. However, many applicants plan to close most DI&C DAC following COL issuance, as allowed by regulations. Most of the open DAC would be associated with hardware and software development processes for long lead-time systems that will likely be procured after COL issuance. Independent from the timing of the applicant's closure of the DAC, the agency will apply a consistent scope and depth of evaluation, during the pre- or post-COL environment.

As an example, the DI&C DAC inspection procedure mirrors the typical DI&C system development life cycle (process oriented) and is geared toward verification of design implementation attributes. It is intended for application at designated development milestones

that coincide with completion of an applicant's or licensee's life cycle activities. In keeping with a previous commitment, the staff is providing elements of the DI&C DAC inspection procedure to ACRS as they are completed. In parallel with development of the DI&C DAC inspection procedure, the staff is also developing procedures for inspection of DAC related to piping systems and human factors engineering. All of the DAC inspection procedures provide a mechanism for thorough verification of design implementation in keeping with the concept of DAC.

Additional Issues

Your letter of August 9, 2010, also discussed a number of issues regarding the use of DAC that did not result in a recommendation or conclusion. These are discussed in the enclosure. The following outlines the staff's perspective on the use of DAC:

- The Commission's policy on DAC, and the NRC staff's implementation of that policy, has been consistent for nearly 20 years in terms of definition, and the role of DAC in the overall licensing and construction process, and the ramifications of their use are well understood.

- When viewed in isolation, especially in DI&C systems, DAC as written may appear insufficient to make the required safety finding. When viewed in the broader context of all the information used by the staff in making its safety finding (e.g., the design control document, reference technical reports, and approved topical reports), the approach used for DAC is sufficient.

- DI&C DAC have unique attributes. The DI&C systems may change during both the life of the certification and throughout operation, unlike much of the facility. Therefore, in the case of DI&C, the current regulatory approach enables safe reactor operations by establishing the safety functions and limiting conditions of the design during certification while allowing implementation changes to occur as technology evolves.

- For the certified designs and some of the designs currently under review, the staff was able to make a safety finding with the use of DAC and less design detail in the final safety analysis report. However, other designs that are highly interconnected and rely on software to protect redundant components would require a more complete design to make the safety finding. In these cases, DAC may not be necessary since the designs would need to be complete in order to resolve all safety issues. As a result, these designs may require more resources during the certification review, during the life of the certification, and throughout the life of the facility for applicants, licensees, and the NRC.

The NRC appreciates the comments and recommendations provided by ACRS. We look forward to continuing to work with the Committee as the staff develops a resolution and closeout process for DAC.

Sincerely,

/RA by Martin J. Virgilio for/

R. W. Borchardt
Executive Director
for Operations

Enclosure:
Staff Perspective on Concerns Raised With
Design Acceptance Criteria

cc: Chairman Jaczko
Commissioner Svinicki
Commissioner Apostolakis
Commissioner Magwood
Commissioner Ostendorff
SECY

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