

D921016

The Honorable Ivan Selin
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Selin:

SUBJECT: SECOND INTERIM REPORT ON THE USE OF THE DESIGN ACCEPTANCE
CRITERIA PROCESS IN THE CERTIFICATION OF THE GENERAL
ELECTRIC NUCLEAR ENERGY ADVANCED BOILING WATER REACTOR
DESIGN

During the 390th meeting of the Advisory Committee on Reactor Safeguards, October 8-10, 1992, we continued our deliberations regarding the use of the design acceptance criteria (DAC) process and associated inspections, tests, analyses, and acceptance criteria (ITAAC) in the certification of the General Electric Nuclear Energy (GE) Advanced Boiling Water Reactor (ABWR) design. Our Ad Hoc Subcommittee on Design Acceptance Criteria considered this matter during its October 7, 1992 meeting. This Subcommittee was established to review the DAC process as requested by the Commission in its April 1, 1992, Staff Requirements Memorandum.

During these meetings we considered SECY-92-299, dated August 27, 1992, which is a staff status report on the subject of the development of DACs for the ABWR certification in the areas of instrumentation and controls (I&C) and control room design. It was evident from our meetings that the staff's review of these DACs and preparation of the supporting draft Final Safety Evaluation Report (FSER) chapters will require extensive further work. During these meetings, we had the benefit of discussions with representatives of the NRC staff and GE. We also had the benefit of the documents referenced.

Our first interim report on the DAC process, dated June 16, 1992, focused mainly on the other two DACs proposed by GE for use in certification of the ABWR design, namely, ITAAC 3.7 "Radiation Protection" and ITAAC 3.3 "Piping Design." We concluded that these DACs (with certain clarifications to the language of the drafts we reviewed) can provide an acceptable basis for the staff's final safety determination needed for design certification. We understand that these DACs will be available in final form for completing our review as part of the FSER. The staff is unable at this time to provide a schedule for completion of the FSER.

This interim report deals with the remaining two DACs of control room design, and instrumentation and controls. In our June 16, 1992 interim report, we indicated that these DACs had not been developed to a point where we could offer an opinion as to their acceptability. We did express concerns to the staff on several aspects of these DACs as they existed at that time. The staff has subsequently responded to these concerns.

Control Room Design DAC

Enclosure 3 of SECY-92-299 contains the DAC (i.e., ITAAC 3.6 "Human Factors Engineering") proposed by GE for the ABWR control room design (human factors aspects), a draft of the staff's FSER for Chapter 18 of the Standard Safety Analysis Report (SSAR), "Human Factors," and a Human Factors Review Model developed by the staff. The staff certification of control room design will be based on the design process described in this ITAAC. The implementation of the control room design process will be the responsibility of the combined operating license (COL) applicant or holder.

The draft FSER contains three open items in this DAC area, all involving documentation issues, that are being completed by GE and will then require the review and approval of the staff. These open items appear to be easily resolvable.

We learned at our meetings that GE had submitted a new revision of ITAAC 3.6 since the issuance of SECY-92-299. It was this new material, which had not been completely reviewed by the staff, that we reviewed. Although we had a number of suggested language clarifications, we conclude that this ITAAC (with appropriate modification) will be able to provide an acceptable basis for the staff's final safety determination needed for design certification. We will complete our review of FSER Chapter 18 and this ITAAC when these documents become available in final form.

Instrumentation and Controls (I&C) ITAAC

Enclosure 2 of SECY-92-299 contains the ITAACs proposed by GE for ABWR I&C and a draft of the staff's FSER for Chapter 7 of the SSAR, "Instrumentation and Control Systems." The staff notes that GE will not have submitted complete design information in the I&C area prior to design certification because this is an area of rapidly changing technology. GE proposes the DAC material be included in the Tier 1 design as one system ITAAC (2.75 "Multiplexing") and three generic ITAACs (3.2 "Instrument Setpoint Methodology," 3.4 "Safety System Logic and Control," and 3.5 "Software Development"). The implementation of the design process described in the Software Development ITAAC would be the responsibility of the COL applicant or holder. Our review focused on the Software Development ITAAC which describes a design process as contrasted to a design.

The draft FSER includes five open items and 19 confirmatory items in the I&C area that are being completed by GE and will require the review and approval of the staff.

We learned at our meetings that GE had submitted a new revision of ITAAC 3.5 since the issuance of SECY-92-299. It was this new material, that had not been reviewed by the staff, that we reviewed. We had a number of suggested clarifications to the language of this ITAAC. In addition, there are certain characteristics of software which, when specified at the beginning of the development process, make later assessment far easier. We believe that the staff and GE should include this concept in the Software Development ITAAC. We conclude that this ITAAC has the potential of providing an acceptable basis for the staff's final

safety determination needed for design certification. We will continue our review as more information becomes available.

Finally, we are concerned about the significant number of post-design certification activities associated with these two DACs - control room design, and instrumentation and controls. The COL applicant or holder will be responsible for carrying out these activities. This will involve extensive future negotiations with the staff. It will also have the effect of diminishing the value of certified designs and seems to us to be contrary to the spirit of 10 CFR Part 52. We believe that the argument that these DACs represent areas of rapidly changing technology is being overplayed by both the staff and GE in justifying the extent to which the DAC process is being used.

We will keep you informed as our review of the DAC process in the certification of the GE ABWR design continues.

Additional comments by ACRS member Harold W. Lewis are presented below.

Sincerely,

David A. Ward
Chairman

Additional Comments by ACRS Member Harold W. Lewis

I have a reservation about the Committee letter, for the specific issue of software certification. I have already taken (Reference 4) a more relaxed position than the Committee in the general area of DACs. That position reflects my view that we are dealing with a mature industry, not at all inexperienced in the design of modern reactors, and therefore requiring a different style of regulation than may have been the case in an earlier period. The most effective role of NRC is through oversight of the safety of the industry product, rather than on certification of each detail. The DAC process lends itself to this kind of regulation, but only in areas in which the staff itself has the experience and expertise necessary to assume this more global role. I hope that the staff will not inhibit the application of modern technology through excessive specificity, as exemplified by the analog backup controversy, on which the Committee has previously commented (Reference 6).

I have a separate nagging problem with the DAC process, as it is now being implemented, one which is exacerbated in this case. The staff is negotiating with the industry not only the potential applicants' programs for compliance with the (still unclear) acceptance criteria, but also the nature of the very requirements that the applicants will later have to meet. It is important to be very circumspect about the NRC's role in this process, lest NRC independence be compromised.

References:

1. SECY-92-299, dated August 27, 1992, from James M. Taylor, Executive Director for Operations, NRC, for the Commissioners, Subject: Development of Design Acceptance Criteria (DAC) for the Advanced Boiling Water Reactor (ABWR) in the Areas of Instrumentation and Controls (I&C) and Control Room Design
2. Staff Requirements Memorandum M920305A dated April 1, 1992, from Samuel J. Chilk, Secretary of the Commission, for David A. Ward, Chairman, ACRS, Subject: Periodic Meeting with the Advisory Committee on Reactor Safeguards on March 5, 1992
3. GE Nuclear Energy, "Tier 1 Design Certification Material for the GE ABWR," dated June 1992
4. Report dated February 14, 1992, from David A. Ward, Chairman, ACRS, to the Hon. Ivan Selin, Chairman, NRC, Subject: Use of Design Acceptance Criteria During 10 CFR Part 52 Design Certification Reviews
5. Report dated June 16, 1992, from David A. Ward, Chairman, ACRS, to the Hon. Ivan Selin, Chairman, NRC, Subject: Interim Report on the Use of Design Acceptance Criteria in the Certification of the GE Nuclear Energy Advanced Boiling Water Reactor Design
6. Report dated September 16, 1992, from David A. Ward, Chairman, ACRS, to the Hon. Ivan Selin, Chairman, NRC, Subject: Digital Instrumentation and Control System Reliability