



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D. C. 20555

December 15, 1981

Honorable Nunzio J. Palladino  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555

SUBJECT: ACRS REPORT ON FINAL DESIGN APPROVAL FOR COMBUSTION ENGINEERING, INC.  
STANDARD NUCLEAR STEAM SUPPLY SYSTEM (STANDARD REFERENCE SYSTEM 80)

Dear Dr. Palladino:

During its 260th meeting, December 10-12, 1981, the Advisory Committee on Reactor Safeguards reviewed the application of Combustion Engineering, Inc. for final design approval for its Standard Reference System 80 described in CESSAR. A Subcommittee meeting was held with representatives of the Applicant and the NRC Staff in Windsor, Connecticut on November 19, 1981. The Committee also had the benefit of the documents listed. The Committee's report on the preliminary design approval for this standard nuclear steam supply system (NSSS) was provided in a letter to the NRC Chairman dated September 17, 1975.

The System 80 design consists of a reactor system with a design rated core output of 3800 Mwt and includes the reactor coolant system, reactor protection system, engineered safety features actuation system, chemical and volume control system, shutdown cooling system, safety injection system, and fuel handling system. The System 80 design provides safety-related interface requirements information essential to the design of the balance of plant. Combustion Engineering provides, at the option of the user, certain other nonstandard safety-related systems and services which are outside the scope of the System 80 design. Such systems will need to be dealt with in each user's Safety Analysis Report. The regulations governing the review of standard plant designs under the "reference system" option described in the Federal Register (42 FR 34395 and 43 FR 38954) are contained in paragraph 2.110 of 10 CFR Part 2 and Appendix O to 10 CFR Part 50.

CESSAR provides information required to ensure that the balance of plant is designed to protect the System 80 from site-related hazards. It envelops all plant sites approved to date for Combustion Engineering nuclear steam supply systems. When the System 80 design is applied, the related site must be evaluated to establish its acceptability within the System 80 envelope. For multiple reactor units at a single site, the reference design requires that each important safety-related item be separately provided for each reactor unit. The first plant using the System 80 design will be Palo Verde Nuclear Generating Station, Units 1, 2, and 3, of which Unit 1 is scheduled to load fuel during November 1982.

Because the utility-applicant is responsible for instituting the quality assurance programs necessary to assure that all safety-related requirements have been met, the NRC must review these matters with the utility-applicants on a case-by-case basis. The ACRS believes that Combustion Engineering should be required to evaluate the adequacy of the implementation of interface requirements, including such items as the influence of plant control system performance and reliability on NSSS integrity and function.

In recent years, the availability of reliable shutdown heat removal capability for a wide range of transients has been recognized to be of great importance to safety. The System 80 design does not include capability for rapid, direct depressurization of the primary system or for any method of heat removal immediately after shutdown which does not require use of the steam generators. In the present design, the steam generators must be operated for heat removal after shutdown when the primary system is at high pressure and temperature. This places extra importance on the reliability of the auxiliary feedwater system used in connection with System 80 steam generators and extra requirements on the integrity of the steam generators. The ACRS believes that special attention should be given to these matters in connection with any plant employing the System 80 design. The Committee also believes that it may be useful to give consideration to the potential for adding valves of a size to facilitate rapid depressurization of the System 80 primary coolant system to allow more direct methods of decay heat removal. The Committee wishes to review this matter further with the cooperation of Combustion Engineering and the NRC Staff.

System 80 employs some new design features for the steam generators, the core outlet flow region, control rod guidance and shrouding, and the core support structure. These appear to be acceptable, but, because they are new features, they should be monitored during early operation to determine if they perform as expected.

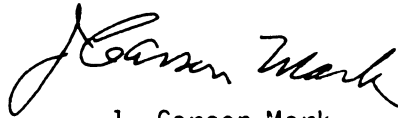
A number of items have been identified as Outstanding Issues and Confirmatory Issues. These include some TMI-2 Action Plan requirements. Progress on these matters is satisfactory, and we believe these issues can be resolved in an acceptable manner. The Committee wishes to be kept informed.

The manner of applying preliminary and final design approvals of the type proposed for System 80 will not be completely defined until System 80 has been used for several licensing actions at both the construction permit and operating license stages. The Committee believes that standard designs such as System 80 can be useful in assuring acceptably safe plants. However, a policy to establish when and how changes will be permitted to new or previously licensed plants is needed.

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The Committee believes that, subject to the above comments and approval of the balance-of-plant designs, the System 80 design can be incorporated into nuclear power plants that can be operated without undue risk to the health and safety of the public.

Sincerely,

A handwritten signature in cursive script, reading "J. Carson Mark".

J. Carson Mark  
Chairman

References:

1. Combustion Engineering, Inc., "System 80 CESSAR FSAR," with Amendments 1 through 5.
2. U.S. Nuclear Regulatory Commission, "Safety Evaluation Report Related to the Final Design of the Standard Nuclear Steam Supply Reference System CESSAR System 80," NUREG-0852, dated November 1981.