Proj 676

Westinghouse Electric Corporation Power Systems

Nuclear Technology Systems Division

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June 12, 1989

NS-NRC-89-3440

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: 600 MWe Advanced Passive PWR Key Safety Topics

Reference: 1. Letter, NS-NRC-89-3412, Westinghouse (Johnson) to NRC (Hodges) dated February 22, 1989

2. Letter, NS-NRC-87-3281, Westinghouse (Johnson) to NRC (Murley) dated November 30, 1987

Dear Dr. Murley:

By letter dated February 22, 1989 (NS-NRC-89-3412), Westinghouse submitted a proprietary document entitled "AP600 Plant Description Report" for an early safety review interaction with NRC staff.

The purpose of the early safety review is to ensure that the fundamental AP600 design characteristics provide a sound approach to compliance with current and anticipated safety and licensing criteria. It is expected that two major findings will be developed as a result of the NRC staff review, namely:

- the AP600 Safety Systems approach is licensable
- the AP600 approach to Severe Accident prevention and mitigation is acceptable.

In order to focus attention to the issues that are unique to AP600 and that support the purpose of the early safety review, key safety topics have been identified for your consideration. The key safety topics are identified in Attachment 1. The AP600 method of providing safety functions is described in the AP600 Plant Description Report.

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As we discussed at our meeting on May 8, 1989, we are requesting that NRC complete the early safety review in September, 1989 so that the results of the review can be used as input into the Design Certification program that we have begun. The early safety review of the AP600 design description report will also serve as a vehicle to familiarize a team of NRC staff experts with the AP600 design concept. An AP600 Licensing Review Basis document, to be prepared in early 1990, will provide a more thorough assessment of the AP600 design compliance with the requirements and guidelines for design approval and certification. We suggest a meeting with you and appropriate members of your staff to overview the design and to discuss the key safety topics associated with the AP600 early safety review.

I will contact you in the near future to establish a date for this familiarization briefing.

Very truly yours,

W. J. Johnson, Manager
Nuclear Safety Department

JPT/bek/0437B

Attachment

ATTACHMENT 1 to NS-NRC-89-3440

AP600 KEY SAFETY TOPICS

I. Application of Passive Systems to provide the essential safety functions of emergency core cooling, residual heat removal, and ultimate heat sink.

Emergency Core Cooling

The passive safety injection system provides for emergency core cooling following any loss of reactor coolant in accordance with General Design Criterion 35.

Residual Heat Removal

The passive residual heat removal heat exchangers provide for transfer of fission product decay heat and other residual heat from the reactor core in accordance with General Design Criterion 34.

Ultimate Heat Sink

The passive containment cooling system provides for removal of heat from the reactor containment in accordance with General Design Criterion 38 and serves as the Ultimate Heat Sink for dissipation of core and residual heat following postulated accidents.

II. Elimination of dependence on safety grade, active, auxiliary and support systems for accident mitigation.

Cooling Water Systems

- The need for safety grade Emergency Feedwater System for residual heat removal is eliminated by the application of the passive residual heat removal system.

- The Passive RHR system eliminates the requirement for a pumped RHR system.

- The Passive Safety Injection system eliminates the requirements for a pumped system.

- Containment spray is not required for heat removal. (A passive, nitrogen pressurized system is provided for fission product removal.)

- The non safety grade spent fuel cooling system provides for heat removal from spent fuel (and from the reactor cooling system) during normal operations. Safety grade spent fuel cooling is assured by the large heat capacity of the spent fuel pit and the assured makeup water to the pool.

- The passive containment cooling system eliminates the requirement for a safety grade essential cooling water system.

HVAC System

- The passive containment cooling system eliminates the need for safety grade containment fan coolers.

- The plant ventilation systems are non-safety related and not required to operate during a plant accident condition. A habitable environment is provided in the emergency control room under emergency conditions, including loss of AC power, by a passive system utilizing compressed air.

Electrical Power Systems

- The plant DC power system provides safety grade power for all plant emergency safe shutdown needs and other vital functions: a safety grade on-site AC power supply is not required.

III. Application of proven technology on principal design features eliminates the need for major development programs.

- Simplified reactor coolant loop

- Low power density core

- Reactor vessel, internals, and radial reflector

- Canned Motor Reactor Coolant Pumps

- Instrumentation and Control System architecture.

IV. AP600 approach to severe accident prevention and mitigation.

- Containment Performance

- Hydrogen Generation

- Source Terms

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