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JUN 4 1974

Mr. John A. Hinds, Mangger
Safety and Licensing
General Electric Company
Nuclear Energy Division
175 Curtner Avenue
San Jose, California 95114

Dear Mr. Hinds:

In order that we may continue our review of your analysis of Anticipated Transients Without Scram (ATWS) additional information is requested. The requested information is described in the attached enclosure and pertains to the reactor coolant pressure boundary limit, containment analysis and operability of components during ATWS transient.

Sincerely,

Original Signed by
Victor Stello

Victor Stello, Jr., Assistant Director
for Reactor Safety
Directorate of Licensing

Enclosure:
Request for Additional
Information

cc: Larry Gifford
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Enclosure 1: REQUEST FOR ADDITIONAL INFORMATION ON ATWS

1. In NEDO 10349 the calculated MCHFR following a turbine trip without bypass of rod scram is not reported. However, analyses of other reactors (e.g., Monticello Generating Plant) indicates that a MCHFR of less than unity may result following a turbine trip without a bypass. Also, provide the values of MCHFR for the following ATWS transients and if MCHFR falls below 1.0 provide analysis of how many rods have undergone a critical heat flux condition, and secondly, report the peak clad temperature and fuel enthalpy limit.

   a Instantaneous loss of condenser vacuum
   b All main steam line isolation valve closure
   c Turbine trip without bypass
   d Feedwater Controller Malfunction - Maximum demand
   e Continuous rod withdrawal during startup
   f Pressure regulator failure - decreasing pressure
   g Loss of feedwater flow
   h Loss of Auxiliary power
   i Recirculation flow controller malfunction-Increasing flow

2. Provide an ATWS analysis for the loss of 100 °F feedwater heating without assuming any delay constant for heater tube cooldown.

3. Provide the values of Doppler and void coefficients used in the analysis of each ATWS transient.

4. Some ATWS transients require initiation of the RCIC and HPCI (or HPCS) systems to maintain vessel level and the RHR system to condense steam and cool the suppression pool water. For the most severe ATWS transient (one that puts maximum demand on the RCIC, HPCI and RHR systems) provide the following data from the start of transient until reactor is at cold shutdown condition:

   a When will the condensate storage tank be depleted?
   b How long will the suppression pool be used as a source of water? Provide the water inventory for the suppression pool during the transient.
   c Provide suppression pool temperature response.
   d Does the RHR provide enough capacity for steam condensing and suppression pool cooling?
   e Vessel level.

5. The GE analysis for ATWS transients has shown the vessel pressure to be as high as 1575 psia. What would be the effect of such a high pressure on the performance of the neutron detection system, instruments and controls, and sampling systems?

6. What is the effect of high pressure resulting from ATWS transients on the integrity and operability of piping systems, valves, pumps and heat exchangers? In order to demonstrate that the reactor coolant pressure boundary integrity is maintained under the imposed pressure-temperature transients associated with ATWS, and the design limits of the "emergency condition" as specified in the ASME code, Section III are not exceeded, provide a summary of stress intensities and stress ranges for the major components, (i.e., reactor vessel, pumps, valves and piping) that comprise the reactor coolant pressure boundary. The analysis should include the effects of overpressure protection devices to limit the pressure rise such that the stress categories P_m, P_L and P_b will not exceed the design limits specified in Figure NB-3224-1 of ASME Code, Section III. The summary of stress intensities and stress ranges should be provided in tabular form as follows:

Component	Stress Categories	Stress Limits (Applicable to materials)
a) Reactors list critical locations in vessel	P_M, P_L, P_B	
b) Pumps list critical locations	P_M, P_L, P_B	
c) Valves list critical locations	P_M, P_L, P_B, P_G, Q	
d) Piping list the locations of Design Basis Break Locations	Eq. (9) Par. NB-3652 Eq. (10) Par. NB-3653	

Where deformation limits are prescribed by the Component Design Specification (Par. NB-3224.6), for active valves, and pumps relied upon in the event of ATWS transient, provide the basis upon which the operability of these components will be assured in the performance of their intended function.

7. Describe the methods and assumptions to be used in the analyses of the ATWS transients to establish the containment pressure response. Compare these methods and assumptions to those used to calculate containment pressure following a LOCA.

8. For each ATWS transient analyzed in NEDO-10349, provide the total mass and energy released to the containment. For those transients releasing an amount of energy to the containment exceeding 20% of the energy in the primary coolant, provide tables of the mass and energy release as a function of time and containment pressure as a function of time.

9. Discuss the sensitivity of the containment peak pressure to variations in the mass release from the safety and relief valves.

10. Provide a comparison of the operational requirements for the containment heat removal and isolation systems for the most severe ATWS transient with those for a design basis loss-of-coolant accident.

11. Provide a list of all containment systems for which the design pressure and temperature conditions are exceeded as a result of a severe ATWS transient. Discuss which components of these systems might fail as a result of these conditions.

12. Provide the results of the limiting ATWS transients (transients resulting in maximum vessel or containment pressure or minimum MCHFR) until the reactor is at zero power in a coolable geometry, with normal after heat removal systems in operation and containment pressure within design limits.

13. Justify the use of 0.53 seconds delay time for the recirculation pump trip pressure sensor and circuitry. Provide analyses which show the sensitivity of pressure to this delay time.

14. Identify the actuation times and the systems actuated for all ATWS transients from the initiation of the transient until the reactor is at zero power in a coolable geometry, with normal after heat removal systems in operation and containment pressure within design limits.

15. Provide a complete list of initial conditions used for each ATWS transient and justify the choice of the numerical values used.

16. What would be the consequences if one of the safety relief valves were to stay stuck open as a result of loss of condenser vacuum ATWS transient? Provide values of critical parameters such as MCHFR, containment pressure and suppression pool conditions.

17. Provide the recirculation pump coastdown characteristics used in the ATWS analyses and as measured.