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MFN-091-81

April 30, 1981

Mr. Darrell Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

SUBJECT: NRC REPORT, "SAFETY CONCERNS ASSOCIATED WITH PIPE BREAKS IN THE BWR SCRAM SYSTEM"

This letter provides the results of General Electric's evaluation of the subject report, and responds to the questions in your April 10, 1981 letter to all BWR licensees. General Electric has been requested to prepare this generic response in behalf of the BWR Licensees.

GE's evaluation of the postulated pipe break scenario and the NRC staff recommendations is documented in the enclosed report NEDO-24342. The Executive Summary in this report provides a succinct review of GE's analysis and conclusions.

Our response to the generic questions requiring an answer within 45 days in your letter to licensees is summarized as follows:

1. The postulated pipe rupture in the scram discharge volume (SDV) is an extremely remote event. General Electric's analysis of the probability of the sequence of events leading to eventual fuel damage from the postulated pipe break is much less than 10-7 per reactor year. This places the frequency beyond the range of occurrences which need to be taken into account in the design of nuclear facilities. (See Appendix A of NEDO-24342.)

   Even if the postulated SDV pipe rupture were to occur, a number of radiation and sump alarms, as well as scram discharge valve position indications, signal to the operating staff the existence of a pipe rupture outside the primary containment. In the event of pipe rupture in the BWR scram discharge piping, automatic system operation would assure adequate core cooling. Current procedures provide

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sufficient guidance to the operator to depressurize the reactor. With depressurization, the break discharge can be controlled so as to preclude any core damage. (See Sections 7 and 8.)

2. GE specifications applicable to design, installation and quality assurance for scram system piping were equivalent to current ASME standards. For example, the load combinations specified for these piping systems were for full operating temperature and pressure, yet these piping systems are exposed to that temperature and pressure environment only about 1% of the time. These piping systems have not exhibited a rupture in over 360 reactor years of operation. (See Section 6.)

3. The NRC staff recommendations need not be implemented because the postulated sequence is of such low probability that design changes are unnecessary. Even if the postulated pipe rupture should occur, current procedures provide sufficient guidance to the operators to initiate depressurization and isolation. Additional pumps, which are not part of the emergency core cooling system, are also available to provide more than sufficient water even if all the emergency core cooling pumps fail to operate. (See Sections 7 and 8.)

   Notwithstanding the remote probability of this scenario taking place, it would not apply to the BWR 6 Mark III. The reason is the location of the scram system piping and headers; water would flow to the wetwell and return to the vessel.

Regarding your request for additional plant specific information within 120 days, we provide the following information:

1. As we stated above, GE's specifications for these piping systems required design, installation and quality assurance equivalent to current ASME standards. (See Section 6.)

2. In the event of pipe rupture in the BWR scram discharge piping, automatic system operation would assure adequate core cooling. However, if the postulated sequence were to occur, the operations crew would terminate the discharge of coolant into the reactor building, as current procedures lead the operators to the detection and isolation of a break. (See Sections 7 and 8.)

3. We have reviewed the applicability of the general design criteria to the scram discharge volume system, and conclude that the scram discharge volume design conforms to 10CFR50 Appendix A, GDC 14, 35, 55, and 10CFR50.2(v), 10CFR 50.55a (including footnote 2), and 10CFR50.46. The scram discharge volume design has been reviewed on each operating plant licensing application including the recent LaSalle operating license review. (See Section 6 and Appendix D).

4. The postulated scram discharge system pipe rupture was evaluated to demonstrate compliance with 10CFR50.46. The results of the evaluation showed that the peak clad temperatures remain well below 1700°F. (See Sections 7.6 and 8.5)

General Electric's analysis and conclusions provide the basis for operating plant licensees to reference NEDO-24342 as their 120 day required response to your April 10, 1981 letter.

In summary, the General Electric evaluation demonstrates that the NRC postulated pipe break with the subsequent sequence of events is such an extremely remote event that is should not be considered in the design basis of BWRs. In addition, we have high confidence that such a postulated pipe break would not be a hazard to the public.

The GE analysis reconfirms the adequacy of the scram system safety features used in boiling water reactors for more than 20 years. It establishes that General Electric's conclusions regarding the safety of the boiling water reactor scram system design, and that the NRC reviews and approvals of the design, were correct. Thus implementation of the recommendations of the NRC report would not result in a meaningful improvement in the safety of General Electric boiling water reactors.

We would be pleased to provide any additional information on the subject.

Very truly yours,

Glenn Sherwood

Glenn G. Sherwood, Manager
Nuclear Safety and Licensing Operation

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Attachment

cc: Mr. W. J. Dircks
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