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July 4, 1980

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Mr. Garry G. Young, Nuclear Engineer,  
 Advisory Committee on Reactor Safeguards,  
 Nuclear Regulatory Commission,  
 Washington, D. C. 20555.

NUCLEAR REG. COMM.  
 ADVISORY COMMITTEE ON  
 REACTOR SAFEGUARDS

Dear Mr. Young:

As requested in your letters of June 10 and June 30, 1980, I have reviewed the proposed rule, "Fire Protection Program for Nuclear Power Plants Operating Prior to January 1, 1979", and the "Draft Statement by Mr. Bender on Fire Protection Rule". I have the following comments.

I assume that the objective is the protection of the public safety. This can be attained if under any conditions, including fire or other contingencies, it is always possible to shut the reactor down and maintain it in safe shutdown condition and prevent release of radioactivity beyond permissible limits.

The proposed rule is too detailed to be used as a general rule, because then all details become mandatory requirements whether necessary or not. It is preferable to state the performance requirements in the rules and to provide the technical details either as a Regulatory Guide or as a Branch Technical Position.

The proposed rule includes requirements for Alternate Shutdown Systems. I believe it is appropriate to require that the plant have redundant systems for shutdown and that they be separated for fire protection and other reasons, but the functional requirements for the systems should be included in the requirements for the plant control systems. Only the fire protection considerations should be included in the fire protection rule.

I agree in general with Mr. Bender's draft statement. I believe his intent is to provide the performance requirements that must be met by an acceptable fire protection program for either new or old plants. I suggest that, in addition, the requirements should include statements that a fire protection program is required and that a fire hazards analysis be made.

I have editorially revised the seven rules suggested by Mr. Bender in the attached pages and have added the two items mentioned above.

In whatever form the rule is finally published, definitions should be included for terms such as safety-related, fire areas, and fire barriers.

Very truly yours,

W. R. Gall

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cc: M. Bender

To satisfy the fire protection needs for public safety in accordance with Criterion 3 of Appendix A to 10 CFR 50 the following requirements shall be met.

1. A fire protection program shall be prepared, documented and maintained. The fire protection program shall provide a defense-in-depth by providing for (1) prevention of fires, (2) rapid detection, control, and extinguishment of fires, (3) arrangement of structures, systems, and components important to safety so that any fire that occurs can neither prevent safe shutdown of the plant nor cause leakage of radioactive material from the plant.

2. The design of nuclear power plants shall include the establishment of fire areas which are capable of preventing any postulated fire from spreading in a way that would jeopardize plant functions that are intended to assure public safety. Specifically, it shall be possible at all times including before, during and after the occurrence of a fire, to safely shut down the reactor, to maintain the plant in a safe shutdown condition, and to prevent the release of unsafe amounts of radioactivity.

3. Sensors shall be provided to alert the operating staff to the existence of fires in any area where the safety-related facilities could be affected. The sensors shall actuate alarms which shall be annunciated in manned operational areas to indicate the location of the fire and the fire-fighting provisions and procedures applicable to its control.

4. Preference shall be given to the use of water as the fire extinguishing agent. Other extinguishing agents may be used if water is unacceptable, but if gaseous extinguishing agents are used to smother or retard combustion, their efficacy shall be established by tests that show effectiveness in control of fires under the conditions of the postulated fire. Special attention shall be given to distrib-

ution, dilution, out-leakage, or other factors that could detrimentally affect the fire extinguishing capability.

5. Distance is the preferred method of separating divisions of safety-related systems and of isolating safety-related systems from fire hazards in nonsafety-related areas. As an alternative, fire barriers shall be used, provided that it is demonstrated by tests and analysis that the barrier is capable of protecting the safety system facilities on one side of the barrier from functional impairment due to the worst possible fire occurring on the other side of the barrier. The barrier shall be capable of resisting the fire for whatever length of time may be needed to provide effective supplemental fire-fighting capability to prevent the fire from spreading across the barrier.

6. The fire protection program shall include periodic testing of fire-fighting equipment, fire sensors, alarm systems, and any other actions required to assure continuous operational availability of those systems. When any fire detecting or fighting equipment or system is not operationally available, human surveillance and emergency standby equipment, as applicable, shall be provided.

7. Documentation shall be established and maintained, including records of fire-fighting personnel training, operational testing of personnel, equipment, and procedures and any other records needed to verify that fire protection provisions are available for use whenever needed.

8. Measures shall be established to assure that public safety is not jeopardized either by malfunction of fire-fighting equipment, if it should occur, or by damage to plant equipment by operation of fire protection equipment.

9. A fire hazards analysis shall be performed and documented to show the adequacy of the fire protection program to ensure the ability (1) to safely shut down the plant during and after a fire, (2) to maintain the plant in safe shutdown condition during and after a fire, and (3) to minimize and control the release of radioactivity to the environment within safe limits.