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REGULATORY GUIDE

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MANUAL INITIATION OF PROTECTIVE ACTIONS

A. INTRODUCTION

Paragraph (h), "Protection Systems," of § 50.55a, "Codes and Standards," of 10 CFR Part 50, "Licensing of Production and Utilization Facilities," requires that protection systems meet the requirements set forth in the Institute of Electrical and Electronics Engineers "Criteria for Nuclear Power Plant Protection Systems" (IEEE 279)[1]. Section 4.17, "Manual Initiation," of IEEE Std 279-1971 requires that protection systems include means for manual initiation of each protective action at the system level and that the single-failure criterion as set forth in Section 4.2 of IEEE 279 be met. This guide describes a method acceptable to the AEC Regulatory staff for complying with the requirements of Section 4.17 of IEEE Std 279-1971 for including the means for manual initiation of protective actions. This guide applies to all types of nuclear power plants. The Advisory Committee on Reactor Safeguards has been consulted concerning this guide and has concurred in the regulatory position.

B. DISCUSSION

Section 4.17 of IEEE Std 279-1971 includes among its requirements the following: (1) manual initiation of each protective action shall be provided at the system level, (2) no single failure shall prevent initiation of protective action, and (3) manual initiation shall depend upon the operation of a minimum of equipment.

It has been contended that in order to meet the requirement of a minimum of operating equipment, manual initiation at the system level could be achieved by the actuation of the several individual manual switches of the protection system components. However, the actuation of the several individual manual switches does not take into account the performance of other actions essential in system-level initiation such as starting auxiliary or supporting systems, sending signals to appropriate valve-actuating mechanisms to assure correct valve position, or providing required action-sequencing functions and any required interlocks.

C. REGULATORY POSITION

1. Means should be provided for manual initiation of each protective action (e.g., reactor trip, containment isolation) at the system level, regardless of whether means are also provided to initiate the protective action at the component or channel level (e.g., individual control rod, individual isolation valve).

2. Manual initiation of a protective action at the system level should perform all actions performed by automatic initiation such as starting auxiliary or supporting systems, sending signals to appropriate valve-actuating mechanisms to assure correct valve position, and providing the required action-sequencing functions and interlocks.

3. The switches for manual initiation of protective actions at the system level should be located in the control room and be easily accessible to the operator so that action can be taken in an expeditious manner.

4. The amount of equipment common to both manual and automatic initiation should be kept to a minimum. It is preferable to limit such common equipment to the final actuation devices and the actuated equipment. However, action-sequencing functions and interlocks (of Position 2) associated with the final actuation devices and actuated equipment may be common if individual manual initiation at the component or channel level is provided in the control room. No single failure within

[1] Copies may be obtained from the Institute of Electrical and Electronics Engineers, 345 East 47th Street, New York, N.Y. 10017.

the manual, automatic, or common portions of the protection system should prevent initiation of protective action by manual or automatic means.

5. Manual initiation of protective actions should depend on the operation of a minimum of equipment, consistent with 1, 2, 3, and 4 above.

6. Manual initiation of protective action at the system level should be so designed that once initiated, it will go to completion as required in Section 4.16 of IEEE Std 279-1971.