



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

July 24, 1980

Docket No. 50-29

Mr. James A. Kay
Senior Engineer-Licensing
Yankee Atomic Electric Company
25 Research Drive
Westborough, Massachusetts 01581

Dear Mr. Kay:

RE: SEP TOPIC VI-7.C.3, PWR LOOP ISOLATION VALVES POWER AND CONTROL
SYSTEM DESIGN
(Yankee-Rowe)

Enclosed is a copy of our current evaluation of Systematic Evaluation Program Topic VI-7.C.3, PWR Loop Isolation Valves Power and Control System Design. This assessment compares your facility, as described in Docket No. 50-29 with the criteria currently used by the regulatory staff for licensing new facilities. Please inform us if your as-built facility differs from the licensing basis assumed in our assessment within 90 days of receipt of this letter.

This evaluation will be a basic input to the integrated safety assessment for your facility unless you identify changes needed to reflect the as-built conditions at your facility. The topic assessment may be revised in the future if your facility design is changed or if NRC criteria relating to the topic are modified before the integrated assessment are completed.

Sincerely,

Dennis M. Crutchfield
Dennis M. Crutchfield, Chief,
Operating Reactors Branch #5
Division of Licensing

Enclosures:
Completed SEP
Topic VI-7.C.3

cc w/enclosure:
See next page

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July 24, 1980

cc

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SEP TECHNICAL EVALUATION
TOPIC VI-7.C.3
PWR LOOP ISOLATION VALVES
POWER AND CONTROL SYSTEM DESIGN

YANKEE ROWE

1.0 INTRODUCTION

The objective of this review is to determine if the primary loop isolation valve power and control system is in compliance with current licensing criteria.

The specific requirements for loop isolation valve power and control system design derive from IEEE 279-1971, which states that the bypass of a protective function will be removed automatically whenever permissive conditions are not met and which also assures that a single electrical failure or operator error will not result in loss of capability of the protection system to perform its safety function.¹ The criteria are further defined in Branch Technical Position ICSB 18².

2.0 CRITERIA

Current licensing criteria from ICSB 18 are:

1. Failures in both the "fail to function" sense and the "undesirable function" sense of components in electrical systems including valves and other fluid system components should be considered in designing against a single failure, even though the valve or other fluid system component may not be called upon to function in a given safety operational sequence.
2. Where it is determined that failure of an electrical system component can cause undesired mechanical motion of a valve or other fluid system component and this motion results in loss of the system safety function, it is acceptable, in lieu of design changes that also may be acceptable, to disconnect power to the electric systems of the valve or other fluid system component. The plant Technical Specifications should include a list of all electrically-operated valves, and the required positions of

these valves, to which the requirement for removal of electric power is applied in order to satisfy the single failure criterion.

3. Electrically-operated valves that are classified as "active" valve i.e., are required to open or close in various safety system operational sequences, but are manually-controlled, should be operated from the main control room. Such valves may not be included among those valves from which power is removed in order to meet the single failure criterion unless (a) electrical power can be restored to the valves from the main control room, (b) valve operation is not necessary for at least ten minutes following occurrence of the event requiring such operation, and (c) it is demonstrated that there is reasonable assurance that all necessary operator actions will be performed within the time shown to be adequate by the analysis. The plant Technical Specifications should include a list of the required positions of manually-controlled, electrically-operated valves and should identify those valves to which the requirement for removal of electric power is applied in order to satisfy the single failure criterion.
4. When the single failure criterion is satisfied by removal of electrical power from valves described in 2. and 3. above, these valves should have redundant position indication in the main control room and the position indication system should, itself, meet the single failure criterion.
5. The phrase, "electrically-operated valves," includes both valves operated directly by an electrical device (e.g., a motor-operated valve or a solenoid-operated valve) and those valves operated indirectly by an electrical device (e.g., an air-operated valve whose air supply is controlled by an electrical solenoid valve).

3.0 DISCUSSION AND EVALUATION

3.1 Discussion. Yankee Rowe has four main coolant loops, each of which has two motor-operated loop isolation valves.³ For power operation, these valves are required to be opened and their power cables disconnected from the motor starters; power cable status is verified by monthly surveillance.⁴ Proper valve position may be verified by both valve position indication and redundant main coolant flow indication.⁵

3.2 Evaluation. The Yankee Rowe loop isolation valve power and control system design meets the requirements of ICSB 18, Parts 2 and 4. Therefore, the design complies with current licensing criteria.

4.0 SUMMARY

The Yankee Rowe loop isolation valve power and control system requires that, for power operation, loop isolation valves be opened and power removed from them, and provides redundant valve position indication. Therefore, the loop isolation valve power and control system design complies with current licensing criteria.

5.0 REFERENCES

1. IEEE Standard 279, "Criteria for Protection Systems for Nuclear Power Generating Stations."
2. Branch Technical Position ICSB 18, "Application of the Single Failure Criterion to Manually-Controlled Electrically-Operated Valves."
3. Yankee Atomic Electric Company Drawing 966-FM-6A, Revision 20, dated May 30, 1978.
4. "Yankee Nuclear Power Station, Technical Specifications," Amendment 52, paragraph 4.5.2.b.3.
5. Loc. cit., Table 3.3.1.