

August 28, 1981

Docket No. 50-245
LS05-81- 08-069

Mr. W. G. Council, Vice President
Nuclear Engineering and Operations
Northeast Nuclear Energy Company
Post Office Box 270
Hartford, Connecticut 06101



Dear Mr. Council:

SUBJECT: SLP TOPIC VII-2, ENGINEERED SAFETY FEATURES (ESF) SYSTEM
CONTROL LOGIC AND DESIGN, SAFETY EVALUATION FOR MILLSTONE 1

The enclosed staff safety evaluation is based on a contractor document that has been made available to you previously. This evaluation supports the findings of the staff safety evaluation of Topic VII-2 and proposes modifications to some equipment to improve electrical isolation.

The need to actually implement these changes will be determined during the integrated safety assessment. This topic assessment may be revised in the future if your facility design is changed or if NRC criteria relating to this topic are modified before the integrated assessment is completed.

Sincerely,

Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Licensing

Enclosure:
As stated

cc w/enclosure:
See next page

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Mr. W. G. Council

cc

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SYSTEMATIC EVALUATION PROGRAM

TOPIC VII-2

MILLSTONE 1

TOPIC: VII-2 ENGINEERED SAFETY FEATURES (ESF) SYSTEM CONTROL LOGIC AND DESIGN

I. INTRODUCTION

During the staff review of the Safety Injection System (SIS) reset (issue #4 in NUREG-0138) the staff determined that the Engineered Safety Features Actuation Systems (ESFAS) at both PWRs and BWRs may have design features that raise questions about the independence of redundant channels, the interaction of reset features and individual equipment controls, and the interaction of the ESFAS logic that controls transfers between on-site and off-site power sources. Review of the as-built logic diagrams and schematics, operator action required to supplement the ESFAS automatic actions, the startup and surveillance testing procedures for demonstrating ESFAS performance appeared to be required.

Several specific concerns exist with regard to the manual SIS reset feature following a LOCA. They are: (1) If a loss of offsite power occurs after reset, operator action would be required to remove normal shutdown cooling loads from the emergency bus and re-establish emergency cooling loads. Time would be critical if the loss of offsite power occurred within a few minutes following a LOCA. (2) If loss of offsite power occurs after reset, some plants may not restart some essential loads such as diesel cooling water. (3) The plant may suffer a loss of ECCS delivery for some time period before emergency power picks up the ECCS system. It was also decided to review the ESF system control logic and design, including bypasses, reset features and interactions with transfers between onsite and offsite power sources.

Since these decisions were made in early 1977, the staff's plans for resolving these issues have changed. Two generic reviews of the diesel generator problems have been conducted by Inspection and Enforcement. The second review includes consideration of bypasses and resets. In addition, Task Action Plan Generic Task B-24 is involved with reset and bypass concerns. Accordingly, this SEP Topic has been modified to reduce duplication of effort.

As a result of the staff's review of the scope of the several related generic efforts and the other SEP Topics, it was decided that the only area that had not been covered was the independence of redundant logic trains. Independence might be compromised by sharing input signals and the use of common controls such as mode switches, reset switches, and logic test facilities.

II. REVIEW CRITERIA

The current licensing criteria are presented in Section 2 of EG&G Report 0419J, "Engineered Safety Features (ESF) System Control Logic and Design."

III. RELATED SAFETY TOPICS AND INTERFACES

The scope of review for this topic was limited to avoid duplication of effort since some aspects of the review were performed under related topics. The related topics and the subject matter are identified below. Each of the related topic reports contain the acceptance criteria and review guidance for its subject matter.

- III-6 Seismic Qualification
- III-11 Seismic Qualification
- III-12 Environmental Qualification
- IV-1.A Operation with Less than All Loops in Operation
- VI-4 Bypass and Reset of Engineered Safety Features (B-24)
- VI-7.A.3 ECCS Actuation System
- VI-7.B ESF Switchover from Injection to Recirculation
- VI-7.C.1 Independence of Onsite Power
- VI-7.C.2 Failure Mode Analysis-ECCS
- VI-7.C.3 The effect of loop isolation valve closure on ECCS performance
- VI-7.D Long Term Cooling Passive Failures (e.g. flooding)
- VI-7.F Accumulator Isolation Valves
- VI-10.A Testing of Reactor Protection Systems
- VI-10.B Shared Systems
- VII-1.A Reactor Trip System Isolation
- VII-3 Systems Required for Safe Shutdown
- VIII-2 Onsite Emergency Power Systems
- VIII-3 Emergency dc Power Systems
- VIII-4 Electrical Penetrations
- IX-3 Ventilation
- IX-6 Fire Protection

The conclusion that suitable isolation devices are provided is a basic assumption for Topics VI-7.C.2 and VII-3.

IV. REVIEW GUIDELINES

The review guidelines are presented in Section 3 of Report 0419J, "Engineered Safety Features (ESF) System Control Logic and Design."

V. EVALUATION

A description of the isolation devices employed in Millstone 1 and a comparison with current design criteria are presented in Report 0419J, "Engineered Safety Features (ESF) System Control Logic and Design."

VI. CONCLUSION

As a result of our review of our contractor's work the staff concludes that Millstone 1 does not conform to current licensing criteria for electrical isolation of redundant safety features and the plant should be modified to satisfy IEEE Std. 279-1971 in this regard.