Central files

September 18, 1981

Docket No. 50-244
LS05-81-09-048

Mr. John E. Maier
Vice President
Electric and Steam Production
Rochester Gas & Electric Corporation
89 East Avenue
Rochester, New York 14649

Dear Mr. Maier:

SUBJECT: SEP TOPIC VI-7.B: ESF (ENGINEERED SAFETY FEATURES) SWITCHOVER FROM INJECTION TO RECIRCULATION MODE, AUTOMATIC ECCS REALIGNMENT, GINNA

The enclosed staff safety evaluation report is based on the information provided in your letter of August 16, 1981. This evaluation is the staff's position regarding design of your facility in the subject area. With regard to the referenced topic, the staff has concluded your facility meets current licensing criteria.

Sincerely,

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

Enclosure:
As stated

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

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TOPIC VI-7.B: ESF (ENGINEERED SAFETY FEATURES) SWITCHOVER FROM INJECTION TO RECIRCULATION MODE, AUTOMATIC ECCS REALIGNMENT

I. INTRODUCTION

Most Pressurized Water Reactors (PWRs) require operator action to realign the ECCS for the recirculation mode following a LOCA. The NRC staff has been requiring, on a case-by-case basis, some automatic features to assist in the realignment of the ECCS from the injection to the recirculation mode of operation. The safety objective of this requirement is to increase the reliability of long-term cooling by reducing the number of operator actions required to change system realignment to the recirculation mode.

The scope of this topic requires a review of the ECCS control system and the operator action required to realign the ECCS from injection to recirculation mode following a LOCA. The sequence of events from initiation of the injection mode to completion of the recirculation mode, the systems/components and instrumentation/controls utilized in the injection to recirculation process, and the automatic and/or manual process required to complete the switchover process are to be reviewed. The objective of this review is to determine if automatic switchover is necessary to protect public health and safety.

II. REVIEW CRITERIA

The current licensing criteria which govern the safety issue are identified in Table 7-1 of the Standard Review Plan. The most significant of these criteria are:

1. Branch Technical Position ICSB 20,
2. IEEE Std. 279-1971, and
3. Regulatory Guide 1.62.

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 Design Considerations
III-10.A Thermal-overload protection for motor operated valves
III-11 Component Integrity
III-12 Environmental Qualification
IV-1.A Operationwith less than all reactor coolant loops in service
V-10.B RHR Reliability
V-11 High Pressure/Low Pressure Interface
VI-7.A.3 ECCS Actuation System
VI-7.C.1 Independence of Onsite Power
VI-10.A Testing of ESF System
VI-10.B Shared Systems

VIII-2 Onsite Emergency Power Systems
VIII-3 Emergency dc Systems
VIII-4 Containment Penetrations

The following topics are dependent on the present topic information for completion.

VI-4 Containment Isolation System
VI-7.C.2 ECCS Single Failure Criterion

IV. REVIEW GUIDELINES

ICSB 20 states that automatic transfer to the recirculation mode is preferable to manual transfer and should be provided for standard plant designs submitted for review on a generic basis under the Commission's standardization policy.

ICSB 20 also states that a design that provides manual initiation at the system level of the transfer to the recirculation mode, while not ideal, is sufficient and satisfies the intent of IEEE Std. 279 provided that adequate instrumentation and information display are available to the operator so that he can make the correct decision at the correct time. Furthermore, it should be shown that, in case of operator error, there are sufficient time and information available so that the operator can correct the error, and the consequences of such an error are acceptable.

V. EVALUATION

Redundant and independent Refueling Water Storage Tank (RWST) level instrumentation is used to alert the operator when he must initiate a manual change over from the injection mode to the recirculation mode of emergency core cooling. The instrumentation is qualified for the worst environmental and seismic conditions. (The RWST is located in the auxiliary building). Each instrument channel is powered from a separate Class 1E bus. These buses are evaluated in SEP Topic VI-7.C.1.

By procedure, one train is to be stopped at 31% RWST level if both trains are operating.

If the operator should ignore this alarm (and his indicator from the other channel) he has 71,925 gallons or approximately 65 minutes until he reaches the 10% RWST level. Changeover normally occurs at 10%, but 34,250 gallons or 31 minutes additional injection on both trains is possible.

Redundant valves are used to close minimum flow lines (that may contain highly radioactive water) that return flow to the refueling water storage tank. However, two of these valves are in series and share the same motive power (air) and fail closed on loss of air. The staff's review of valve failures does not indicate a history of failures in air operated valves at the Ginna plant.

VI. CONCLUSION

As a result of our review, the staff concludes that:

1. ICSB 20 has been satisfied;

2. A recirculation path to the refueling water storage tank relies upon two air operated valves that share an air supply. Although these valves are not entirely independent, plant operating experience has demonstrated the acceptability of this design; and

3. Beyond the failures identified in Topic VI-7.C.1, there are no single failures within either ECCS train that could result in a simultaneous loss of both ECCS train nor in a significant release of fision products as a result of the changeover from the injection to the recirculation mode of ECCS at Ginna.