



Public Service of New Hampshire

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January 28, 1983

SBN-440
T.F. B7.1.2

United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. George W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing

References: (a) Construction Permits CPPR-135 and CPPR-136, Docket
Nos. 50-443 and 50-444

Subject: Single Failure Assumptions: (SRP 15.2.1, 15.2.2, 15.2.3,
15.2.4, 15.2.5, 15.2.6; RAI 440.64, 440.69, and 440.125;
Reactor Systems Branch)

Dear Sir:

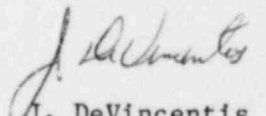
The enclosed response regarding single failure assumptions for Condition II events supplements the original response which was submitted in our letter dated March 12, 1982.

This open item was discussed with representatives of the Reactor Systems Branch at meetings conducted on January 10-12, 1983.

The enclosed response will be included in OL Application Amendment 49.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY


J. DeVincentis
Project Manager

ALL/fsf

cc: Atomic Safety and Licensing Board Service List

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Response to NRC Open Item

Re: RSB Q's 440.64 and 440.125: Justification of worst single failures; also peak RCS pressures and fuel performance

The NRC RSB open item requests that the applicant discuss the resulting RCS pressures and fuel performance for the transients in combination with its limiting single failure. This question was asked with respect to condition II events.

All incidents of moderate frequency were analyzed consistent with the acceptance criteria given in the Standard Review Plan concerning peak pressure (less than 110% of design), fuel integrity (DNBR limit), generation of more serious plant conditions, and single active failures.

Pressure transients for each event are provided in the FSAR and demonstrate that the pressure remains below 110% of design pressure. Fuel cladding integrity is demonstrated for each case by showing that the DNBR remains above the limit value. This is discussed in the results and conclusions sections for each event.

The single failures assumed for each accident are provided in Table 440.64-1. These single failures were selected based on the requirements of 10CFR50 Appendix A, the SRP, and Reg. Guide 1.53 (which addresses IEEE-279 and IEEE-379). A single failure is "...an occurrence which results in the loss of capability of a component to perform its intended safety functions." (10CFR50 App. A). The single failure criterion states that a "single failure within the protection system shall not prevent proper protective action at the system level when required" (IEEE-279).

The protection system is therefore required and designed to meet the single failure criterion. This is accomplished by redundancy, independency and diversity. Parameters that indicate conditions related to safety input have redundant measurement systems. A coincident logic is employed such that a failure of one sensor will not prevent reactor trip or safeguards actuation. Two trains of logic are provided. Each channel and train is physically and electrically independent. Independence assures that a single malfunction will

interrupt only one of the redundant channels or trains. Diversification is achieved by having different methods to perform similar functions. Since the protection system meets the single failure criterion, a single active failure within the protection system will have no impact, as seen in Table 440.64-1, except where safeguards features are involved. Failures of pumps etc, will affect the transient, since the total capacity of the safeguards system is impacted.

The single failures which are considered are active failures, consistent with the SRP acceptance criteria. Failures in the protection system which are not required to mitigate the consequences of an accident are not considered. These are failures of systems which are not challenged during the transient and are not active failures. Such failures are independent failures and are therefore not within the scope of incidents of moderate frequency.

The single failures listed in Table 440.64-1 are the limiting single failures for their respective events, consistent with the preceeding discussion.