SNUPPS

Standardized Nuclear Unit Power Plant System

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Executive Director

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SLNRC 83-0054 FILE: 0278
SUBJ: Instrumentation and Control Systems Branch Review

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Docket Nos. STN 50-482 and STN 50-483

Reference: SLNRC 83-0005, dated February 2, 1983; Qualification of Control Systems

Dear Mr. Denton:

The reference letter forwarded a report entitled "Analysis of a Main Steam Line Break with Coincident Control Rod Withdrawal" applicable to the SNUPPS plants, Callaway Plant and Wolf Creek Generating Station. This report was submitted to satisfy the requirements of licensing Confirmatory Issue 13 and B.14 for Callaway and Wolf Creek, respectively.

Enclosed are two revised pages to be inserted in that report. The modified pages clarify the results and conclusions of the report and are based on discussions between Westinghouse Electric Corporation and the NRC Staff. The report, as modified, addresses the NRC Staff concerns and provides an acceptable basis for resolution of the licensing issue.

Very truly yours,

Nicholas A. Petrick

MHF/nld5b4
Enclosure

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Enclosure

REVISED PAGES FOR REPORT

"ANALYSIS OF A MAIN STEAM LINE BREAK
WITH COINCIDENT CONTROL ROD WITHDRAWAL"

Replace the final two narrative pages of the subject report with the attached revised pages.

low steamline pressure, this break is fed by all four steam generators. Following steamline isolation the break will be fed from one steam generator causing an assymetric transient.

h. In computing the steam flow during a steamline break, the Moody Curve for fL/D=0 is used.

Results

The calculated sequence of events for the SLB/RCCA withdrawal transient is shown on Table 1.

Figures 1 and 2 show the RCS transient and core heat flux following the steamline rupture with coincident RCCA withdrawal.

The steamline break affects the turbine impulse transmitters and causes the control rods to withdraw at the initiation of the transient. This causes an increase in reactor power and core heat flux to the point at which the overpower delta-T trip setpoint is reached. This increase in core power generates a reactor trip which terminates the most adverse part of the transient. The steamline break causes an increased heat removal and consequent decrease in primary pressure simultaneous with the increase in reactor power. Secondary pressure also decreases until the low steamline pressure setpoint is reached initiating steamline and feedwater isolation.

Because of the lower RCS pressure coincident with the increase in reactor power, the consequences at the point of peak heat flux may be more adverse than the Uncontrolled Rod Cluster Control Assembly Bank Withdrawal at Power transient analyzed in the SNUPPS FSAR. Thus, the steamline break with coincident RCCA withdrawal is analyzed to ensure that the FSAR is limiting. The most limiting part of this transient pertinent to this study is immediately prior to reactor trip; for this reason the analysis is terminated at 50 seconds. The modeling of Engineered Safeguards Features (SI, SLI, FWI) is not needed since they will not be generated prior to reactor trip. The return to power following reactor trip and steamline isolation is bounded by the transient for the larger break presented in the FSAR. The FSAR analysis assumed a larger break size and initial conditions corresponding to no-load temperatures (i.e. less stored energy in the RCS and reactor fuel).

Margin to Critical Heat Flux

A DNB analysis was performed for this transient. The DNBR was found to be greater than the limit value at all times.

CONCLUSIONS

The analysis demonstrates that the DNBR does not decrease below the limit value and no fuel or clad damage is predicted. Additionally, no system overpressurization is expected, thus all applicable safety criteria are met. Furthermore, the results are bounded by the accident analyses currently presented in the FSAR. Prior to reactor trip, this transient is bounded by the Uncontrolled Rod Cluster Control Assembly Bank Withdrawal at Power event. As stated in the results, this transient is bounded by the large steamline break analysis in the FSAR after reactor trip. There is therefore adequate protection on the SNUPPS plants to ensure plant safety for this transient.