

Maine Yankee

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April 8, 1997

MN-97-53

JRH-97-76

Proposed Change No. 194
Supplement 1

UNITED STATES NUCLEAR REGULATORY COMMISSION

Attention: Document Control Desk

Washington, DC 20555

References: (a) License No. DPR-36 (Docket No. 50-309)
(b) MYAPC Letter to USNRC dated August 15, 1995 (MN-95-97)

Subject: Proposed Technical Specification Change No. 194, Supplement 1, Reactor Coolant Flow Rate Requirements

Gentlemen:

Reference (b) submitted a proposed change to Maine Yankee Technical Specifications regarding reactor coolant flow rate requirements.

On March 20, 1997, Maine Yankee met with the NRC at the One White Flint office to discuss the proposed change. During that meeting, among other things, we expanded upon the basis for our conclusion that the small break LOCA (SBLOCA) event and resulting peak clad temperature would not be adversely affected by our proposed Technical Specification change to reduce RCS flow. At your request, we are also submitting that information through this letter.

The participants in the meeting also asked several questions regarding the wording of the proposed Technical Specification. While the wording of Technical Specification 3.10.E.2 provided in Reference (b) has not changed, we have provided clarifying information in the Bases for the proposed change.

Attachment A provides a summary of the qualitative evaluation of the effects on SBLOCA of operation under the proposed Technical Specification change as presented to your staff on March 20, 1997. The evaluation concludes that the change will be bounded by the full power conditions. The evaluation and results are based upon comparison of the dominant parameters (Core Power Level, LHGR Limits, Initial T_{Hot} and S/G Tube Plugging Levels) and is independent of the analysis method used to determine the full power analysis basis. Furthermore, the current SBLOCA analysis of record (updated CE Cycle 4 analysis) also bounds the allowable operating conditions defined by the proposed Technical Specification change.

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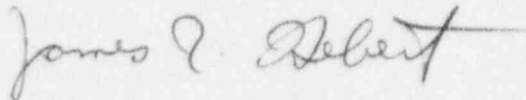
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Attachment B provides additional information in the basis for Technical Specification 3.10.E.2 (Page 3.10-9) which clarifies the proposed change.

Please note that the wording of the Technical Specification in PC 194 remains unchanged as does the "no significant hazards evaluation".

Should you have any questions regarding the above, please contact me.

Very truly yours,

A handwritten signature in cursive script, appearing to read "James R. Hebert", with a long horizontal flourish extending to the right.

James R. Hebert, Manager
Licensing & Engineering Support Department

c: Mr. H. J. Miller
Mr. D. H. Dorman
Mr. J. T. Yerokun
Mr. Patrick J. Dostie
Mr. Uldis Vanags

ATTACHMENT A

Qualitative Evaluation of Operation
Under the Proposed Technical Specification Change on SBLOCA
Proposed Change 194
Reactor Coolant Flow Rate Requirements

ATTACHMENT A

Qualitative Evaluation of Operation Under the Proposed Technical Specification Change on SBLOCA

INTRODUCTION

On March 20, 1997, Maine Yankee met with the NRC at the One White Flint office to discuss Proposed Change (PC) 194, Reference (b). During that meeting, among other things, we expanded upon the basis for our conclusion that the small break LOCA (SBLOCA) event and resulting peak clad temperature would not be adversely affected by our proposed Technical Specification change to reduce RCS flow. This attachment documents the presentation made to the NRC on March 20, 1997 on the reduced RCS flow Tech Spec change.

DISCUSSION

The proposed Tech Spec change allows for power operation with up to a 5% reduction in RCS flow. To offset the potential impact of this reduction in flow, the allowable reactor power will be reduced (1.5% per 1% in flow). In addition, the PLHGR limits, Limiting Condition of Operations (LCOs), and trip setpoints will also be reduced, as discussed in Reference (b). These measures more than offset the effect of reduced RCS flow.

The effects of the following key parameters on the SBLOCA response were presented to the NRC staff: 1) Power Level, 2) LHGR Limits, 3) Initial T_{hot} , and 4) SG Tube Plugging Levels. The sections below summarize the information presented to the NRC for each parameter.

Power Level

The reduction in power level impacts the initial conditions assumed in the LOCA analysis. For a given RCS flow and inlet temperature (t_{cold}), a lower core power will result in a lower hot leg temperature, T_{hot} . In addition, the initial fuel stored energy will be reduced. The direct impact of a lower core power level will be a slower core uncover, lower steam temperature after core uncover, and a lower RCS pressure response for a given rate of RCS mass depletion. These factors will result in a lower calculated Peak Cladding Temperature (PCT).

LHGR Limits

The reduction in the peak LHGR has a direct impact on the LOCA analysis. The fuel rod heat up rate is directly impacted by the allowable peak power level in the fuel rod. This will result in a lower PCT.

Initial T_{hot}

The initial hot leg temperature is reduced as a result of the reduction in the allowable core power level. A reduction in T_{hot} will lower the RCS pressure at which vapor will be formed and as a result the pressure plateau will occur at a lower condition. A lower pressure plateau will result in lower break flow and higher ECCS flow. This leads to a less severe core uncover, i.e. a higher minimum collapsed liquid level, and an earlier core recovery. The net impact is a lower calculated PCT.

SG Tube Plugging Levels

The Tech Spec change does not directly impact the SG plugging levels. The current analysis addresses a plugging level of 1000 SG tubes per SG. A change above 1000 tubes per SG would require additional analysis.

Evaluation of Current Analysis of Record

Additional qualitative analysis has been performed to demonstrate that the current SBLOCA analysis of record (updated CE Cycle 4 analysis) also bounds the allowable operating conditions defined by the proposed Technical Specification change.

The confirmatory order restricts the core power level to 90% of the rated power of 2700 MWth. The SBLOCA analysis performed for these conditions were compared to those defined by the proposed Tech Spec change. The most important parameter to consider in this evaluation is the hot leg temperature. The evaluation does not make a direct assumption regarding the maximum hot leg temperature but assumes a maximum cold leg temperature of 560°F. This analysis is based on the CE Cycle 4 system response which assumed a core power level of 2630 MWth (+2% uncertainty). Under full flow conditions, the cold leg temperature assumption translates to a hot leg temperature of 610.4°F. Under the minimum reduced flow conditions (95% of rated flow) and a power of 2440 MWth (+2% uncertainty) this translates to a hot leg temperature of 609.3°F. It should also be noted that the current Tech Spec limit of T_{cold} is 551.3°F or 555.3°F with allowance for measurement uncertainty. Thus the maximum allowable hot leg temperature at 2440 MWth and the minimum reduced flow is actually 604.9°F. This is well below the analysis supporting the confirmatory order. Thus the hot leg temperature, the reduced LHGR limits, and the assumed SG plugging levels, under the minimum reduced flow conditions (at 2440 MWth), are bounded by the current SBLOCA analysis.

CONCLUSION

The proposed reduced RCS flow Tech Spec change has been evaluated with respect to impact on the SBLOCA event and it has been determined that this change will be bounded by full power conditions and the current analysis of record. This conclusion stems from the conservative reduction of power level (1.5% for each 1% of flow reduction). Thus, the reduced flow conditions are less limiting than the full power conditions with respect to the LOCA events. This evaluation is independent of the analysis method used to define the full power analysis basis and is based on a comparison of the dominant parameters. Furthermore, the current analysis of record also bounds the allowable operating conditions (dominant parameters) defined by the proposed Tech. Spec. change.