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MILLER,C.L. Project Directorate I-2

SUBJECT: Forwards Proposed Amend 152 to License NPF-14,changing TS in order to correct flow dependent MCPR operating limits recently approved in NRC 920507 Cycle 7 reload amend.

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MAY 21 1992

Director of Nuclear Reactor Regulation
Attention: Mr. C. L. Miller, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENT 152 TO LICENSE NO. NPF-14:
FLOW DEPENDENT MCPR OPERATING LIMITS FOR U1C7
PLA-3780 **FILES A17-2/R41-2** **Docket No. 50-387**

References: 1) *Letter, J.J. Raleigh to H.W. Keiser, "Cycle 7 Reload Amendment, Susquehanna Steam Electric Station, Unit 1 (TAC No. M82356)", dated May 7, 1992.*

2) *Letter, H.W. Keiser to C.L. Miller, "Administrative Control of Flow Dependent MCPR Operating Limits for U1C7 Operation", dated May 15, 1992.*

Dear Mr. Miller:

The purpose of this letter is to propose a change to the SSES Unit 1 Technical Specifications in order to correct the flow dependent MCPR Operating Limits that you recently approved in Reference 1. Reference 2 describes the basis for current operation of SSES Unit 1 under these proposed limits until they are formally approved by the NRC.

DESCRIPTION OF PROPOSED CHANGE:

See revised Figure 3.2.3-1, attached.

BACKGROUND:

On May 6, 1992, during final independent review of the Unit 2 Cycle 6 (U2C6) reload licensing analysis packages, an error was discovered in the calculation of the Technical Specification flow-dependent MCPR operating limit curve (*Figure 3.2.3-1*). This error will be corrected for U2C6 prior to submitting the proposed reload amendment to the NRC. The flow-dependent MCPR operating limits curve derived for U1C7 was subsequently checked and found to contain the same error. The following paragraphs describe the basis for the flow-dependent MCPR operating limit curve, the nature of the calculational error, and provide a safety assessment of the proposed change.

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BASIS FOR THE FLOW-DEPENDENT MCPR OPERATING LIMIT:

The flow-dependent MCPR operating limit curve is derived based on the analysis of the design basis Recirculation Flow Controller Failure (RFCF) event. An inadvertent reactor recirculation pump runup would result in a power increase, due to void reactivity feedback, and a consequential decrease in MCPR margin.

Because this event can cause a larger decrease in MCPR at lower initial flows than other limiting events at full power (e.g., Generator Load Rejection), higher MCPR operating limits are required at reduced core flow conditions. The licensing analysis of the RFCF event requires numerous parametric calculations in order to determine the limiting pump runup rate. The analyses are performed using PP&L's NRC-approved licensing analysis methods. The reactor system response to the RFCF is calculated with the RETRAN code, and the resultant delta-CPR is determined based on hot bundle RETRAN analyses and hand calculations.

NATURE OF THE CALCULATIONAL ERROR:

The analyses of the RFCF for U1C7 were performed using the methodology described in PP&L's NRC-approved licensing topical reports. An error was discovered in the calculation of the flow-dependent MCPR operating limit curve. More specifically, the error involves the equation used to compute the delta-CPR from which the MCPR operating limit is derived. The transient hot bundle delta-CPR is calculated based on reaching a minimum CPR equal to 1.0. PP&L's methodology requires that a 4% uncertainty (i.e., 1.04 factor) be applied to the relative change in CPR (RCPR = delta CPR/initial CPR). From the adjusted RCPR, the final delta-CPR is calculated and added to the MCPR Safety Limit (equal to 1.06). However, analyses show that a transient initiated from a higher initial MCPR results in a higher value of calculated delta-CPR, compared to the identical transient initiated from a lower initial MCPR. This aspect of the delta-CPR calculation was omitted in the calculation for U1C7. Therefore, relative to PP&L's defined methodology, the flow-dependent MCPR operating limit for U1C7 was calculated incorrectly, and resulted in an incorrect Technical Specification *Figure 3.2.3-1* being transmitted to and subsequently approved by the NRC. Pertinent portions of the hand calculation found to be in error are attached for information.

SAFETY ASSESSMENT OF THE PROPOSED CHANGE:

The corrected MCPR Operating Limits were entered into PP&L's Powerplex core monitoring system on May 15, 1992. PP&L is therefore currently operating under these limits, and it is proposed that this interim change be made permanent.

This proposal is justified for the following reasons:

1. PP&L has corrected the single calculational error, and the new Figure 3.2.3-1 is consistent with what the NRC believed they approved in support of U1C7 operation, i.e., it is the result of proper implementation of PP&L's NRC-approved licensing methods.

2. The new curve is more restrictive over the entire range where the RFCF transient is limiting. Since the proposed change results from the correction of a calculational error which supports the analysis of this event, it is worthwhile to note the significant conservatisms in PP&L's methodology for this event:

   - No credit is taken for the simulated thermal power monitor trip.

   - The failure assumed is a two recirculation pump runup. A two pump runup as a result of a single failure can only occur when the recirculation system is in master-manual control mode. This mode of operation is prohibited below 45% recirculation pump speed (corresponding to approximately 55% core flow). The RFCF event is not limiting above approximately 73% core flow (this is shown on the attached figure of old vs. new curves where the two curves merge). Thus, the region of concern is limited to a window of between approximately 55% and 73% core flow.

   - The worst case runup rate is assumed. This rate is extremely slow (on the order of ten minutes), and no operator action is assumed.

   - Uncertainties in trip setpoints and code uncertainties are included.

   - No credit is taken for the operability of the turbine bypass system.

3. PP&L has reviewed the engineering calculation package on which all of the MCPR Operating Limits for U1C7 (both power and flow-dependent) are based. No errors were found.

4. PP&L has performed a reasonableness check of the other U1C7 limiting transient (generator load reject without bypass) that was previously reviewed by the individual who missed the calculational error in the RFCF analysis. No errors were found.

Based on the above information, PP&L can be assured that the proposed Figure 3.2.3-1 is the result of correct implementation of PP&L's NRC-approved licensing methods, and contains appropriate safety margin to the MCPR Safety Limit. The proposed Figure 3.2.3-1 will ensure reactor operation within its design basis and preserve the validity of the U1C7 reload safety analysis. It is therefore both proper and safe to implement permanently for U1C7 operation.

NO SIGNIFICANT HAZARDS CONSIDERATIONS

1. *This proposal does not involve a significant increase in the probability or consequences of an accident previously evaluated.*

   This change corrects a single calculational error to ensure that the Technical Specification flow dependent MCPR Operating Limits are based on correct implementation of PP&L's NRC-approved licensing methods. This action will ensure SSES U1C7 operation is within its design basis, and preserves the validity of the U1C7 reload safety analysis. Therefore, it will not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. *This proposal does not create the possibility of a new or different type of accident from any accident previously addressed.*

   The proposed change corrects an error in a single calculation supporting development of MCPR Operating limits for a specific transient. This action therefore ensures that proper operating limits are in place for an event that has been previously addressed. It does not create the possibility of a new or different type of accident from any accident previously addressed.

3. *This change does not involve a significant reduction in a margin of safety.*

   Implementation of the proposed change will ensure that the safety margin resulting from the reload safety analysis will be preserved for U1C7 operation. Therefore, it does not involve a significant reduction in a margin of safety.

IMPLEMENTATION

PP&L will abide by the commitments made in Reference 2 above until the proposed change is issued by the NRC. Those commitments are:

1. PP&L will operate under administrative controls that ensure that the corrected flow dependent MCPR operating limits are enforced, and

2. PP&L will reduce power below 25% (MCPR Technical Specification applicability) if the turbine bypass system becomes inoperable. This compensatory action simply recognizes that the currently approved flow dependent MCPR operating limit curve is valid as long as the turbine bypass system is operable.

Any questions on this request should be directed to Mr. R. Sgarro at (215) 774-7914.

Very truly yours,

H.W. Keiser

Attachments

cc: NRC Document Control Desk (original)
NRC Region I
Mr. G. S. Barber, NRC Sr. Resident Inspector - SSES
Mr. J. J. Raleigh, NRC Project Manager - OWFN
Mr. T. M. Gerusky, Pa. DER