BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of :

Docket No. 50-387

PENNSYLVANIA POWER & :
LIGHT COMPANY

REVISED PROPOSED AMENDMENT No. 199
FACILITY OPERATING LICENSE NO. NPF-14
SUSQUEHANNA STEAM ELECTRIC STATION
UNIT NO. 1

Licensee, Pennsylvania Power & Light Company, hereby files proposed Amendment No. 199 to its Facility Operating License No. NPF-14 dated July 17, 1982.

This amendment contains a revision to the Susquehanna SES Unit 1 Technical Specifications.

PENNSYLVANIA POWER & LIGHT COMPANY
BY:

R. G. Byram
Sr. Vice President - Nuclear

Sworn to and subscribed before me
this 28th of May, 1996.

Martha C. Sedora
Notary Public

Notarial Seal
Martha C. Sedora, Notary Public
Allentown, Lehigh County
My Commission Expires Jan. 15, 1998
Member, Pennsylvania Association of Notaries

ENCLOSURE A TO PLA-4466

SAFETY ASSESSMENT

ANFB CRITICAL POWER CORRELATION, MCPR SAFETY LIMITS, AND METHODOLOGY TO SUPPORT LEAD USE ASSEMBLIES

BACKGROUND

ANFB CORRELATION

Excessive overheating of the fuel rod cladding can result in cladding damage and the release of fission products. In order to protect the cladding against overheating due to boiling transition, the THERMAL POWER, High Pressure and High Flow SAFETY LIMIT (Section 2.1.2 of the Susquehanna Steam Electric Station Technical Specifications) was established.

NUREG-0800, Standard Review Plan Section 4.4, specifies an acceptable, conservative approach to define this SAFETY LIMIT. Specifically, a Minimum Critical Power Ratio (MCPR) value is specified such that at least 99.9% of the fuel rods are expected to avoid boiling transition during normal operation or anticipated operational occurrences. Boiling transition is predicted using a correlation based on test data (i.e., a Critical Power Correlation). Currently, the XN-3 Critical Power Correlation is used to monitor the Unit 1 core.

The specific values of MCPR used for the SAFETY LIMITS (two-loop and single-loop) are calculated using NRC approved licensing methods. The SAFETY LIMIT MCPR calculation combines various uncertainties such as feedwater flow, feedwater temperature, pressure, power distribution uncertainties, and uncertainty in the Critical Power Correlation. The current Susquehanna Steam Electric Station Technical Specification SAFETY LIMITS were derived using the XN-3 Critical Power Correlation developed by Siemens Power Corporation (SPC).

PP&L plans to replace the existing core monitoring system with the more advanced POWERPLEX-II core monitoring system. In order to be able to monitor more advanced fuel designs (such as the SPC ATRIUM-10 design being loaded into Unit 2 in the Spring of 1997), the more advanced ANFB Critical Power Correlation is used in POWERPLEX-II. The ANFB correlation is based on more test data for current and advanced SPC fuel designs than the currently used XN-3 correlation.

Included in the revised Technical Specifications via reference (Section 6.9.3.2) is PL-NF-90-001, Supplement 2. This report reflects modifications to PP&L's licensing methods applicable to the ANFB correlation, as well as the use of the CASMO3G lattice physics code. NRC approval for Supplement 2 is pending.

Thus, this proposed change to the Susquehanna SES Unit 1 Technical Specifications reflects a change in the Critical Power Correlation used to compute the Minimum Critical Power Ratio (MCPR). The changes reflect the substitution of the ANFB Critical Power Correlation in place of the XN-3 correlation currently used.

LEAD USE ASSEMBLIES

PP&L is planning to insert four Asea Brown Boveri (ABB) Lead Use Assemblies (LUAs) in the Susquehanna Steam Electric Station (SSES) Unit 1 Cycle 10 core. The PP&L LUAs will be of the ABB SVEA-96+ design and will be placed in non-limiting locations. Some key features of the SVEA-96+ fuel design are:

- 10X10 Fuel Rod Array Configuration
- 96 Fuel Rods
- A Large Central Water Cross
- Seven Spacers
- Debris Filter

ABB is performing licensing analyses of the Unit 1 SVEA-96+ LUAs using the CENPD-300 methods and will demonstrate that all applicable licensing limits are satisfied.

AFFECTED TECHNICAL SPECIFICATIONS

The proposed change entails changes to the MCPR Safety Limit values (Sections 2.1 and 3.4.1.1.2), the addition of methodology references in Section 6.9.3.2, and associated BASES changes (BASES Sections 2.1 and 3/4.4).

SAFETY ANALYSIS

Analysis

ANFB CORRELATION

General Design Criterion 10 requires that the specified acceptable fuel design limits are not exceeded during steady state operation, normal operational transients, and anticipated operational occurrences (AOOs). The fuel cladding integrity Safety Limit is set such that no significant fuel damage from cladding overheating is calculated to occur if the limit is not violated. MCPR greater than the specified limit represents a conservative margin relative to the conditions required to maintain fuel cladding integrity.

The MCPR Safety Limit helps ensure sufficient conservatism in the operating MCPR limit such that, in the event of an AOO from the limiting condition of operation, at least 99.9% of the fuel rods in the core would be expected to avoid boiling transition. The margin between calculated boiling transition (i.e., MCPR=1.0) and the MCPR Safety Limit is based on a statistical procedure that considers the uncertainties in monitoring the core operating state. One specific uncertainty included in the Safety Limit is the uncertainty inherent in the critical power correlation.

The critical power correlation is based on a significant body of practical test data, providing a degree of assurance that the critical power, as evaluated by the correlation, is within a small percentage of the actual critical power being estimated. As long as the core pressure and flow are within the range of validity of the correlation, the assumed reactor conditions used in defining the Safety Limit introduce conservatism into the limit because bounding, high radial power factors and bounding, flat local peaking distributions are used to estimate the number of rods in boiling transition.

A cycle specific MCPR Safety Limit analysis was performed for PP&L by SPC. This analysis used NRC approved methods described in the SPC reports: ANF-524(P)(A), Revision 2, and Supplement 1, Revision 2, "Advanced Nuclear Fuels Corporation Critical Power Methodology for Boiling Water Reactors;" and ANF-1125 (P)(A) and Supplement 1, "ANFB Critical Power Correlation." The SAFETY LIMIT MCPR calculation statistically combines uncertainties on feedwater flow, feedwater temperature, core flow, core pressure, core power distribution, and the uncertainty in the Critical Power Correlation. The SPC analysis uses cycle specific power distributions and calculates a Safety Limit MCPR such that at least 99.9% of the fuel rods are expected to avoid boiling transition during normal operation or anticipated operational occurrences. The resulting two-loop and single-loop values (Technical Specification Sections 2.1 and 3.4.1.1.2) are included in the proposed change.

NRC approval of the licensing methodology used to compute the transient ΔCPR is currently pending (PL-NF-90-001, Supplement 2). The methods described in PL-NF-90-001, Supplement 2, will be used to generate MCPR Operating Limits for the Unit 1 Core Operating Limits Report.

ABB LEAD USE ASSEMBLIES

Technical Specification 6.9.3.2 identifies analytical methods used to determine core operating limits for the applicable Unit's current operating cycle. These methods are described in the referenced topical reports which are reviewed and approved by the NRC.

To support the insertion of the four ABB Lead Use Assemblies in the Unit 1 Cycle 10 core, the ABB methodology as described in CENPD-300-P, "Reference Safety Report for Boiling Water Reactor Reload Fuel," dated November 1994 needs to be referenced in the SSES Technical Specifications. This methodology will be used to calculate the operating limits for the four LUAs (e.g., MCPR, LHGR, and MAPLHGR), which are of a different mechanical design from the current Siemens Power Corporation 9X9-2 fuel used in Unit 1.

Adding the reference to the list of Technical Specification references will allow the use of this ABB methodology, as the approved methodology in demonstrating that all applicable safety criteria (e.g., fuel thermal-mechanical limits, core thermal hydraulic limits, ECCS limits, criticality limits and transient and accident limits) are met.

Conclusion

This proposed change to the Susquehanna SES Technical Specifications reflects a change in the Critical Power Correlation used to compute the Minimum Critical Power Ratio (MCPR). The use of the advanced ANFB Critical Power Correlation in PP&L's licensing methods is a valid means of calculating MCPR Operating Limits. NRC approved methods are used to compute the MCPR Safety Limits and Operating Limits. PP&L's licensing methods, as modified to use ANFB, are valid for advanced fuel types and 24 month cycle operation.

The use of this methodology will ensure that the safety margin is maintained with the insertion of the four ABB Lead Use Assemblies. Additionally, operator impact will be relatively unaffected in that operators will monitor the core normally through the use of POWERPLEX-II. The operating limits for the LUAs will be a specific input to POWERPLEX-II and the Core Operating Limits Report.

ENCLOSURE B TO PLA-4466

NO SIGNIFICANT HAZARDS CONSIDERATIONS

ANFB CRITICAL POWER CORRELATION, MCPR SAFETY LIMITS, AND METHODOLOGY TO SUPPORT LEAD USE ASSEMBLIES

Pennsylvania Power & Light Company has evaluated the proposed Technical Specification change in accordance with the criteria specified by 10 CFR 50.92 and has determined that the proposed change does not involve a significant hazards consideration. The criteria and conclusions of our evaluation are presented below.

1. **The proposed change does not involve an increase in the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety, as previously evaluated.**

   The change to the ANFB correlation and corresponding MCPR Safety Limits does not physically change the plant systems, structures, or components. Thus, the probability of occurrence of an event evaluated in the SAR is not increased. The acceptance criterion for the MCPR Safety Limit (i.e., 99.9% of the fuel rods expected to avoid boiling transition) is not changed. Only the methodology used to demonstrate compliance is changed. Therefore, the consequences of anticipated operational occurrences (which must show the Safety Limit is not violated) are not changed.

   Adding the reference of CENPD-300-P, "Reference Safety Report for Boiling Water Reactor Reload Fuel," to the list of references in Unit 1 Technical Specifications will allow the use of the ABB methodology to calculate the operating limits for the four Lead Use Assemblies which are of different mechanical design from the Siemens 9x9-2 fuel. The use of this ABB methodology will ensure that the applicable safety limits of the safety analysis are met for the four LUAs. Results of incorporating this change will not significantly increase the probability or the consequences of an accident previously evaluated.

2. **The proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.**

   As stated above, this methodology change does not impact the acceptance criterion for the MCPR Safety Limits and does not physically change the plant systems, structures, or components. Since no changes to the physical plant are being made, this change does not create the possibility of a new event not previously evaluated in the SAR.

   The incorporation of this change will allow the use of the ABB methodology to be referenced as the methodology to show that all applicable limits of the safety analysis are met by the four ABB LUAs. Therefore, the incorporation of this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed change does not involve a significant reduction in a margin of safety.

A cycle specific MCPR Safety Limit analysis was performed by SPC. This analysis used NRC approved methods described in the SPC report: ANF-524(P)(A), Revision 2 and Supplement 1, Revision 2. The MCPR Safety Limit value is calculated such that at least 99.9% of the fuel rods are expected to avoid boiling transition during normal operation or anticipated operational occurrences. Both the existing analysis using XN-3 and the new analysis using ANFB utilize NRC approved methods to accomplish this same objective. Therefore, the change to an ANFB based Safety Limit does not involve a significant reduction in a margin of safety.

The use of the ABB methodology will not result in a change in safety margin, but will ensure that the safety margin is maintained with the insertion of the four ABB LUAs in the Unit 1 Cycle 10 core. Therefore, the incorporation of these changes will have no impact on current safety margins, nor will they involve a significant reduction in the margin to safety.

ENVIRONMENTAL CONSEQUENCES

This request is consistent with the Susquehanna design basis, in that the acceptance criterion for the MCPR Safety Limit (i.e., 99.9% of the fuel rods expected to avoid boiling transition) is unchanged. Only the methodology used to demonstrate compliance is changed, however, this methodology is NRC approved. Additionally, the supplemental methodology for the insertion of the four ABB LUAs yields the same results as that which is currently approved. Therefore, no environmental consequences that have not been previously considered are anticipated.

ENCLOSURE C TO PLA-4466