

**BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION**

In the Matter of _____ :
PENNSYLVANIA POWER & LIGHT COMPANY : Docket No. 50-388

**ADDENDUM TO PROPOSED AMENDMENT NO. 166
FACILITY OPERATING LICENSE NO. NPF-22
SUSQUEHANNA STEAM ELECTRIC STATION
UNIT NO. 2**

Licensee, Pennsylvania Power & Light Company, hereby files an addendum to proposed Amendment No. 166 to its Facility Operating License No. NPF-22 dated March 23, 1984.

This amendment contains a revision to the Susquehanna SES Unit 2 Technical Specifications.

PENNSYLVANIA POWER & LIGHT COMPANY
BY:



R. G. Byram
Sr. Vice President - Nuclear

Sworn to and subscribed before me
this 15 of March 1997.



Notary Public

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

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SAFETY ASSESSMENT

REVISED ANFB METHODOLOGY AND CORE FLOW DEPENDENT MCPR SAFETY LIMITS

BACKGROUND

Susquehanna Steam Electric Station Unit 2, Cycle 9 will utilize SPC ATRIUM™-10 fuel. The ATRIUM™-10 fuel design is a 10x10 lattice design which contains 83 full length fuel rods, 8 part length fuel rods, and a central water channel.

During an NRC inspection of Siemens Power Corporation, the NRC raised a number of issues regarding the application of ANFB to ATRIUM™-10. To address these issues, SPC developed a more conservative MCPR methodology to support the use of ANFB for the U2C9 reload of ATRIUM™-10 at Susquehanna Steam Electric Station. Approval of the Reference 3 methodology is required to support Unit 2 Cycle 9 Operation.

Description of the Proposed Change

The proposed Unit 2 Technical Specification change consists of:

- (1) Inclusion of core flow dependent MCPR Safety Limits to Sections 2.1.2 and 3.4.1.1.2,
- (2) Inclusion of Siemens Power Corporation (SPC) methodology topical report (Reference 3) in Section 6.9.3.2, and
- (3) Correction of a typographical error in one of the previously proposed references added to Section 6.9.3.2.

Reference 3 plus the NRC approved topical reports previously proposed to be added to the Technical Specifications (References 1 and 2) contain methodology which will be used to ensure safe operation of Unit 2 with ATRIUM™-10 fuel.

Changes to the BASES section to reflect the revised ANFB methodology are also included.

SAFETY ANALYSIS

This section discusses the safety implications of the proposed action.

MCPR Safety Limits (Sections 2.1.2 and 3.4.1.1.2)

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

LIMITs (Sections 2.1.2 and 3.4.1.1.2 of the Susquehanna SES Unit 2 Technical Specifications) were 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). The SAFETY LIMIT MCPR calculation accounts for various uncertainties such as feedwater flow, feedwater temperature, pressure, power distribution uncertainties, and uncertainty in the Critical Power Correlation. Currently, the ANFB Critical Power Correlation is used to predict boiling transition for SPC fuel at Susquehanna.

The proposed cycle specific SAFETY LIMIT MCPR values (two-loop and single-loop) were calculated using SPC's NRC approved licensing methods as modified by Reference 3. The Reference 3 methodology addresses an observed flow dependence in the accuracy of ANFB's critical power predictions for ATRIUMTM-10 fuel as well as an increased correlation uncertainty for high local peaking factor rods. The relation of predicted critical power to bundle flow, the flow dependent correlation uncertainties, and the increased uncertainty for high local peaking factor rods are derived directly from ATRIUMTM-10 critical heat flux test data and are used as input to the Safety Limit analyses. To address the flow dependence, safety limit calculations (using SPC's NRC approved methodology) are performed at various core flows to generate a core flow dependent MCPR Safety Limit. The SAFETY LIMIT MCPRs (two-loop and single-loop) are defined as functions of core flow according to the Reference 3 methodology and assure that at least 99.9% of the fuel rods are expected to avoid boiling transition during normal operation or anticipated operational occurrences. The proposed core flow dependent SAFETY LIMIT MCPRs are greater than or equal to the values proposed in Reference 1.

Addition of Siemens Methodology Reference (Section 6.9.3.2)

Reference 3 documents a conservative methodology for applying the ANFB critical power correlation to ATRIUMTM-10 fuel at Susquehanna. This methodology conservatively accounts for a flow dependence in the ATRIUMTM-10 critical power test data on MCPR Safety Limits (discussed above) and MCPR Operating Limits. The impact on AOOs of ANFB's flow dependence in critical power prediction is also addressed. For events which exhibit a decrease in bundle flow, the Δ CPR is increased accordingly. Use of this methodology will result in conservative MCPR Safety Limits and MCPR Operating Limits for Unit 2 Cycle 9.

Reference 3 plus the NRC approved topical reports previously proposed to be added to the Technical Specifications (References 1 and 2) contain methodology which will be used to ensure safe operation of Unit 2 with ATRIUM™-10 fuel.

BASES Changes

Changes to BASES Section 2.1.2 to reflect the revised ANFB methodology are also included.

CONCLUSIONS

The proposed changes to the Susquehanna SES Unit 2 Technical Specifications support the use of ATRIUM-10 fuel. Reference 3 presents a Susquehanna specific conservative methodology for applying the ANFB critical power correlation to ATRIUM™-10 fuel. The Reference 3 methodology will be used to determine the MCPR Safety Limits and Operating Limits for Unit 2 Cycle 9.

NRC approval of the proposed Technical Specification changes (References 1, 2, and this letter) will ensure that the methodologies contained in Technical Specification Section 6.9.3.2 can be used in support of ATRIUM™-10 fuel at Susquehanna Unit 2.

REFERENCES

1. PLA-4527, "Proposed Amendment No. 166 to License NPF-22: Unit 2 Technical Specification Changes for ATRIUM-10 Fuel", December 18, 1996.
2. PLA-4572, "Correction to Proposed Amendment No. 166 to License NPF-22: Unit 2 Technical Specification Changes for ATRIUM-10 Fuel", February 26, 1997.
3. EMF-97-010, Rev. 1, "Application of ANFB to ATRIUM-10 for Susquehanna Reloads", March 1997.



NO SIGNIFICANT HAZARDS CONSIDERATIONS

**REVISED ANFB METHODOLOGY AND CORE FLOW DEPENDENT
MCPR SAFETY LIMITS**

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 a significant increase in the probability or consequences of an accident previously evaluated.**

The applicable section of the FSAR is Chapter 15. Chapter 15 describes the transient and accident analyses. The reference to be added to Section 6.9.3.2 of the Unit 2 Technical Specifications describes a conservative methodology for generating MCPR Safety Limits and MCPR Operating Limits to assure safe operation of Unit 2 with ATRIUM™-10 fuel. A typographical error was corrected to reflect the proper report identification which received an NRC SER and has no safety significance. A discussion of the impact of the proposed Technical Specification change is provided below.

The proposed change in MCPR methodology does not physically affect the plant or its systems. Thus, it does not increase the probability of an accident previously evaluated.

A cycle specific MCPR Safety Limit analysis was performed for PP&L by SPC. This analysis used NRC approved methods described in Technical Specification Reference 13 (ANF-524(P)(A), Revision 2 and Supplement 1 Revision 2), as modified by EMF-97-010, Rev. 1. 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 used cycle specific power distributions and calculated MCPR values such that at least 99.9% of the fuel rods are expected to avoid boiling transition during normal operation or anticipated operational occurrences. The SAFETY LIMIT MCPRs are specified as a function of core flow. The resulting two-loop and single-loop values (Technical Specification Sections 2.1.2 and 3.4.1.1.2) are included in the proposed change. Thus, the cladding integrity and its ability to contain fission products are not adversely affected.

The new MCPR methodology (SPC report EMF-97-010, Rev. 1), included in the revised Technical Specifications via reference (Section 6.9.3.2), describes a conservative method for developing the MCPR Safety Limits and Operating Limits for the U2C9 reload of ATRIUM™-10 fuel in the Susquehanna Steam Electric Station. This methodology conservatively accounts for a flow dependence in the ATRIUM™-10 critical power test data as well as an increased correlation uncertainty for high local peaking factor rods. The result



of using this methodology will be core flow dependent MCPR Safety Limits plus conservative MCPR Operating Limits for Unit 2 Cycle 9. The resulting MCPR Safety Limits and Operating Limits will continue to assure that at least 99.9% of the fuel rods are expected to avoid boiling transition during normal operation or anticipated operational occurrences. Thus, the cladding integrity and its ability to contain fission products are not adversely affected.

Using the approach discussed in Reference 1, analyses of the Single Loop Pump Seizure accident with the new MCPR methodology (SPC report EMF-97-010, Rev. 1) will demonstrate that the NRC acceptance criterion (i.e., small fraction of 10CFR100 dose limits) is met.

The BASES changes for Section 2.1.2 reflect the revised ANFB methodology.

The consequences of transients and accidents will remain within the criteria approved by the NRC. Thus, analysis results using the new, more conservative methodology will continue to provide assurance that the reactor will perform its design safety function during normal operation and design basis events. Therefore, the proposed action does not involve a significant increase in the probability or 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 accident previously evaluated.**

The proposed changes to the Unit 2 Technical Specifications (MCPR Safety Limits and inclusion of methodology reference) do not require any physical plant modifications, physically affect any plant components, or entail significant changes in plant operation. Thus, the proposed change does not create the possibility of a previously unevaluated operator error or a new single failure. The consequences of transients and accidents will remain within the criteria approved by the NRC. Therefore, the proposed change does 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.**

The applicable Technical Specification Sections include 2.0, 3/4.2, 3/4.4, and 6.9.3.2.

The changes to the Unit 2 Technical Specifications discussed in Item 1 above do not require any physical plant modifications, physically affect any plant components, or entail significant changes in plant operation. Therefore, the proposed change will not jeopardize or degrade the function or operation of any plant system or component governed by Technical Specifications. The consequences of transients and accidents will remain within the criteria approved by the NRC. The proposed MCPR Safety Limits and the revised MCPR

methodology detailed in the reference added to Section 6.9.3.2 maintain at least an equivalent margin of safety as currently defined in the BASES of the applicable Technical Specification sections.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

ENVIRONMENTAL CONSEQUENCES

An environmental assessment is not required for the proposed change because the requested change conforms to the criteria for actions eligible for categorical exclusion as specified in 10 CFR 51.22(c)(9). The requested change will have no impact on the environment. The proposed change does not involve a significant hazards consideration as discussed above. The proposed change does not involve a significant change in the types or significant increase in the amounts of any effluents that may be released offsite. In addition, the proposed change does not involve a significant increase in the individual or cumulative occupational radiation exposure.