

**BEFORE THE  
UNITED STATES NUCLEAR REGULATORY COMMISSION**

In the Matter of

:

Docket No. 50-388

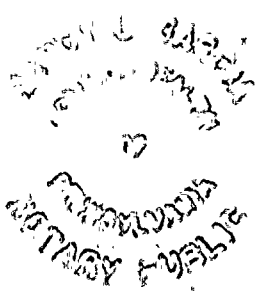
PENNSYLVANIA POWER &  
LIGHT COMPANY

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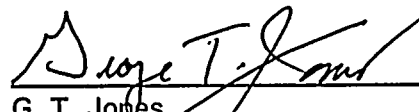
**PROPOSED AMENDMENT NO. 169  
FACILITY OPERATING LICENSE NO. NPF-22  
SUSQUEHANNA STEAM ELECTRIC STATION  
UNIT NO. 2**

Licensee, Pennsylvania Power & Light Company, hereby files proposed Amendment No. 169 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:

  
\_\_\_\_\_  
G. T. Jones  
Vice President - Nuclear Operations

Sworn to and subscribed before me  
this 16 of *April*, 1997.

  
\_\_\_\_\_  
Notary Public

Notarial Seal  
Nancy L. Garcia, Notary Public  
Salem Twp., Luzerne County  
My Commission Expires May 31, 1999  
Member, Pennsylvania Association of Notaries

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## SAFETY ASSESSMENT

### EMERGENCY REQUEST TO ALLOW CONTINUATION OF UNIT 2 OUTAGE TO OPERATIONAL CONDITION 3

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#### BACKGROUND

Susquehanna Steam Electric Station Unit 2, Cycle 9 will utilize the advanced design Siemens Power Corporation (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. PP&L submitted its proposal for amendment (Reference 1) to allow the use of ATRIUM™-10 fuel in December of 1996. During its preliminary review, the NRC concluded that approval of PP&L's proposed amendment would need to be delayed until a preplanned inspection of Siemens Power Corporation was conducted. Issues relating to the analytical basis for the use of ATRIUM™-10 fuel surfaced during this NRC inspection of SPC and have caused an unanticipated delay in completing the requested Reference 1 review. PP&L has obtained NRC approval to load the Unit 2 core with the ATRIUM™-10 fuel (Reference 4), however, Unit 2 is currently restricted to Operational Condition 5.

#### DESCRIPTION OF THE PROPOSED CHANGE

This request for an emergency change will allow continuation of the outage and the completion of activities such as vessel reassembly and hydrostatic testing, and as stated above, relies solely on existing NRC approved codes and methods. Specifically, PP&L is requesting changes to the footnote in the Design Feature Section 5.3.1 to allow use of ATRIUM™-10 fuel in Operational Conditions 3 and 4.

#### SAFETY ANALYSIS

This section discusses the safety implications of the proposed action. Note that this assessment only addresses the effects of operating in Operational Conditions 3 and 4 with the ATRIUM™-10 fuel. Use of the ATRIUM™-10 fuel in Operational Condition 5 has received NRC approval (Reference 4). Fuel vault and spent fuel pool criticality and the fuel handling evaluations performed to support the use of ATRIUM™-10 fuel in Operational Condition 5 are not affected by the proposed changes and remain valid.

The use of ATRIUM™-10 fuel in Operational Condition 5 (Refuel) has been previously approved by the NRC. The use of ATRIUM™-10 fuel in Operational Conditions 3 (Hot Shutdown) and 4 (Cold Shutdown) only increases the allowable temperatures and pressures of the coolant. The reactor core will be restricted to subcritical operation.

Because the shutdown margin is calculated for a coolant temperature of 68°F as defined in the Technical Specifications, the same shutdown margin analysis previously performed to support operation in Condition 5 is applicable to operation in Operational Conditions 3 and 4. As discussed in the previously approved submittal (PLA-4587), core shutdown margin is defined as the amount of shutdown core reactivity with all the control rods inserted and with the strongest worth control rod fully withdrawn at 68° F and at zero Xenon poison concentration. PP&L's NRC approved methodology for calculating SDM is contained in Technical Specification Section 6.9.3.2 Topical Reports 3 and 21. Validation of the methodology as it applies to ATRIUM™-10 is described in Technical Specification Section 6.9.3.2 Topical Report 21. Core shutdown margin calculations have been performed using NRC approved methodology for the Unit 2 Cycle 9 (U2C9) final core configuration. Core shutdown margin was evaluated conservatively by using a lower Cycle 8 energy, thereby making the resident SPC 9x9-2 fuel more reactive. Calculated core shutdown margin for the beginning of cycle core loading is greater than 1.00%  $\Delta k/k$  which far exceeds the Technical Specification value of 0.38 % $\Delta k/k$ . Therefore, the ATRIUM™-10 fuel can be used in Operational Conditions 3 and 4 with assurance that the core will remain subcritical with the strongest worth rod withdrawn.

Since in Operational Conditions 3 and 4 the reactor can be at higher temperatures and pressures than the previously approved Operational Condition 5, the impact of an unplanned blowdown was considered. In case of an unplanned blowdown, the reactor will remain subcritical and no adverse safety consequences would result. Also, since the ATRIUM™-10 fuel will remain subcritical in Operational Conditions 3 and 4, there will be no accumulation of fission products in the fuel.

The NRC approved methodology for ensuring fuel bundle integrity is discussed in Reference 3. SPC mechanical design calculations, performed using NRC approved methodology, demonstrate that ATRIUM™-10 complies with the NRC approved criteria (Reference 3). The NRC has approved of the use of the criteria document for ATRIUM™-10 fuel in Reference 4. Thus the ATRIUM™-10 fuel will maintain its structural integrity during operation in Operational Conditions 3 and 4.

The consequences of transients and accident are not increased as a result of using ATRIUM™-10 fuel in Operational Conditions 3 and 4. The proposed change does not increase the probability of an accident previously evaluated or create the possibility of a previously unevaluated operator error or a new single failure.

#### 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-4582, "Addendum to Proposed Amendment No. 166 to License NPF-22: Revised ANFB Methodology and Flow Dependent MCPR Safety Limits," March 12 1997.

3. ANF-89-98(P)(A) Revision 1 and Revision 1 Supplement 1, "Generic Mechanical Design Criteria for BWR Fuel Designs," Advanced Nuclear Fuels Corporation, May 1995.
4. Letter C. Poslusny (NRC) to R. G. Byram (PP&L), "Susquehanna Steam Electric Station, Unit 2 (TAC NO. M98166)," April 9, 1997.

**NO SIGNIFICANT HAZARDS CONSIDERATIONS AND ENVIRONMENTAL  
ANALYSIS**

**EMERGENCY REQUEST TO ALLOW CONTINUATION OF UNIT 2 OUTAGE TO  
OPERATIONAL CONDITION 3**

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**NO SIGNIFICANT HAZARDS CONSIDERATIONS**

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.

Due to the limitation of this proposed change to Operational Conditions 3 and 4, only a subset of the accident events analyzed in the FSAR needed to be addressed. All other events were considered and the addition of ATRIUM™-10 fuel to the reactor core for operation in Operational Conditions 3 and 4 does not increase the probability or consequences of an accident previously evaluated. Note that the use of ATRIUM™-10 fuel in Operational Condition 5 (Refuel) has been previously approved by the NRC. The use of ATRIUM™-10 fuel in Operational Conditions 3 (Hot Shutdown) and 4 (Cold Shutdown) only increases the allowable temperatures and pressures of the coolant. The reactor core will be restricted to subcritical operation. Fuel vault and spent fuel pool criticality and the fuel handling evaluations performed to support NRC approval of ATRIUM™-10 fuel in Operational Condition 5 are not affected by the proposed change. The events considered are described below.

Because the shutdown margin is calculated for a coolant temperature of 68°F as defined in the Technical Specifications, the same shutdown margin analysis previously performed to support operation of ATRIUM™-10 in Condition 5 is applicable to operation in Operational Conditions 3 and 4. As discussed in the previously approved submittal (PLA-4587), core shutdown margin calculations were performed using NRC approved methodology for the beginning of cycle core configuration. Validation of the shutdown margin methodology as it applies to ATRIUM™-10 was done through comparisons to Siemens' Power Corporation analyses and higher-order Monte Carlo calculations. Calculated core shutdown margin for the beginning of cycle core loading is greater than 1.00%  $\Delta k/k$  which far exceeds the Technical Specification value of 0.38 % $\Delta k/k$ . Therefore, the ATRIUM™-10 fuel can be used in U2C9 in Operational Conditions 3 and 4 with assurance that the core will remain subcritical with

the strongest worth rod withdrawn. A positive core shutdown margin assures protection against the control rod removal error during refueling (FSAR Section 15.4.1.1) because subcriticality is maintained.

Since in Operational Conditions 3 and 4 the reactor can be at higher temperatures and pressures than the previously approved Operational Condition 5, the impact of an unplanned blowdown was considered. In case of an unplanned blowdown, the reactor will remain subcritical and no adverse safety consequences would result. Also, since the ATRIUM™-10 fuel will remain subcritical in Operational Conditions 3 and 4, there will be no accumulation of fission products in the fuel.

The NRC approved methodology for ensuring fuel bundle integrity is discussed (via reference) in the current Technical Specification Section 6.9.3.2 (Topical Report #22). SPC mechanical design calculations, performed using NRC approved methodology, demonstrate that ATRIUM™-10 complies with the NRC approved criteria in all Operational Conditions. The NRC has approved of the use of the criteria document for ATRIUM™-10 fuel. Thus the ATRIUM™-10 fuel will maintain its structural integrity during operation in Operational Conditions 3 and 4.

Based on the foregoing, 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 use of ATRIUM™-10 fuel in Operational Condition 5 (Refuel) has been previously approved by the NRC. The use of ATRIUM™-10 fuel in Operational Conditions 3 (Hot Shutdown) and 4 (Cold Shutdown) only increases the allowable temperatures and pressures of the coolant. The reactor core will be restricted to subcritical operation. Fuel vault and spent fuel pool criticality and the fuel handling evaluations performed to support NRC approval of ATRIUM™-10 fuel in Operational Condition 5 are not affected by the proposed change. Shutdown margin is calculated using NRC approved methods and is shown to be well above the Technical Specification Limit of 0.38% and the mechanical design meets the NRC approved criteria in Technical Specification Section 6.9.3.2 (Topical Report #22). Because these analyses have been previously approved by the NRC to support operation of the ATRIUM™-10 fuel in Operational Condition 5, 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 use of ATRIUM™-10 fuel in Operational Condition 5 (Refuel) has been previously approved by the NRC. The use of ATRIUM™-10 fuel in Operational Conditions 3 (Hot Shutdown) and 4 (Cold Shutdown) only increases the allowable temperatures and pressures

of the coolant. The reactor core will be restricted to subcritical operation. In the event of an unplanned blowdown, the fuel will remain subcritical. Fuel vault and spent fuel pool criticality and the fuel handling evaluations performed to support NRC approval of ATRIUM™-10 fuel in Operational Condition 5 are not affected by the proposed change. Shutdown margin is calculated using NRC approved methods and is shown to be well above the Technical Specification Limit of 0.38% and the mechanical design meets the NRC approved criteria in Technical Specification Section 6.9.3.2 (Topical Report #22). Because these analyses have been previously approved by the NRC to support operation of the ATRIUM™-10 fuel in Operational Condition 5, the proposed change does not involve a significant reduction in a margin of safety.

### ENVIRONMENTAL ANALYSIS

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.

**ENCLOSURE C TO PLA-4610**  
**TECHNICAL SPECIFICATION MARK-UPS**