April 25, 1997

Mr. Robert G. Byram
Senior Vice President-Nuclear
Pennsylvania Power and Light Company
2 North Ninth Street
Allentown, PA 18101

SUBJECT: ISSUANCE OF AMENDMENT FOR SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2 (TAC NO. M98402)

Dear Mr. Byram:

The Commission has issued the enclosed Amendment No. 138 to Facility Operating License No. NPF-22 for the Susquehanna Steam Electric Station, Unit 2. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated April 16, 1997, and as supplemented by a letter dated April 18, 1997.

This amendment changes the footnote in the Design Features Section 5.3.1 of the TSs to allow the use of ATRIUM-10 fuel in Operational Conditions 3 and 4.

A copy of our Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's Biweekly Federal Register Notice.

Sincerely,
/S/
Chester Poslusny, Senior Project Manager
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-388

Enclosures: 1. Amendment No. 138 to License No. NPF-22
2. Safety Evaluation

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

PENNSYLVANIA POWER & LIGHT COMPANY

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-388

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 138
License No. NPF-22

1. The Nuclear Regulatory Commission (the Commission or the NRC) having found that:

   A. The application for the amendment filed by the Pennsylvania Power & Light Company, dated April 16, 1997, and as supplemented by a letter dated April 18, 1997, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of the Facility Operating License No. NPF-22 is hereby amended to read as follows:

   (2) Technical Specifications and Environmental Protection Plan

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 138, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. PP&L shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of issuance and is to be implemented upon receipt.

FOR THE NUCLEAR REGULATORY COMMISSION

Donald S. Brinkman for John F. Stolz, Director
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: April 25, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 138

FACILITY OPERATING LICENSE NO. NPF-22

DOCKET NO. 50-388

Replace the following page of the Appendix A Technical Specifications with enclosed page. The revised page is identified by Amendment number and contains vertical lines indicating the area of change.

REMOVE	INSERT
5-6	5-6

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 764 fuel assemblies.* Each assembly consists of a matrix of Zircaloy clad fuel rods with an initial composition of non-enriched or slightly enriched uranium dioxide as fuel material and water rods or water channels. Limited substitutions of Zirconium alloy filler rods for fuel rods, in accordance with NRC-approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff-approved codes and methods, and shown by test or analyses to comply with all fuel safety design bases.** A limited number of lead use assemblies that have not completed representative testing may be placed in non-limiting core regions. Reload fuel shall have a maximum lattice average enrichment of 4.5 weight percent U-235.

CONTROL ROD ASSEMBLIES

5.3.2 The reactor core shall contain 185 cruciform shaped control rod assemblies. The control material shall be boron carbide powder (B_4C), and/or Hafnium metal. The control rod shall have a nominal axial absorber length of 143 inches. Control rod assemblies shall be limited to those control rod designs approved by the NRC for use in BWRs.

5.4 REACTOR COOLANT SYSTEM

DESIGN PRESSURE AND TEMPERATURE

5.4.1 The reactor coolant system is designed and shall be maintained:

a. In accordance with the code requirements specified in Section 5.2 of the FSAR, with allowance for normal degradation pursuant to the applicable Surveillance Requirements,

b. For a pressure of:

1. 1250 psig on the suction side of the recirculation pumps.

2. 1500 psig from the recirculation pump discharge to the jet pumps.

c. For a temperature of 575°F.

VOLUME

5.4.2 The total water and steam volume of the reactor vessel and recirculation system is approximately 22,400 cubic feet at a nominal T_{ave} of 532°F.

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* ATRIUM™-10 fuel is only allowed in the reactor core in OPERATIONAL CONDITIONS 3, 4, and 5.

** The design bases applicable to ATRIUM™-10 fuel are those which are applicable to OPERATIONAL CONDITIONS 3, 4, and 5.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO.138TO FACILITY OPERATING LICENSE NO. NPF-22

PENNSYLVANIA POWER & LIGHT COMPANY

ALLEGHENY ELECTRIC COOPERATIVE INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

DOCKET NO. 50-388

1.0 INTRODUCTION

By letter dated April 16, 1997, as supplemented April 18, 1997, the Pennsylvania Power and Light Company (PP&L or the licensee) submitted a request for changes to the Susquehanna Steam Electric Station, Unit 2, Technical Specifications (TSs). The requested changes would change the footnote in the Design Features Section 5.3.1 of the TSs to allow the use of ATRIUM-10 fuel in Operational Conditions 3 and 4. Previously, PP&L submitted on December 18, 1996, a TS change request which would permit the use of ATRIUM-10 fuel under all operating conditions for the upcoming fuel cycle for Unit 2. This submittal is currently under review.

In addition, the staff had approved, on April 9, 1997, an amendment that permitted the licensee to load the fuel into the core and maintain Condition 5, refueling.

2.0 EVALUATION

The proposed change would allow the plant to enter Operational Conditions 3 and 4 with ATRIUM-10 fuel loaded in the reactor core. Operational Condition 3 (Hot Shutdown) (>200 degrees F), and Operational Condition 4 (Cold Shutdown) (<200 degrees F) permit increases in the allowable temperatures and pressures of the reactor coolant but would not permit the reactor to become critical. The staff's findings concerning the design features of the ATRIUM-10 fuel and core loading for Condition 5 (refueling) (previously approved) remain unchanged for Conditions 3 and 4.

Mechanical Design

TS Section 6.9.3.2 references the NRC-approved topical report ANF-89-98(P)(A) Revision 1 and Revision 1, Supplement 1, "Generic Mechanical Design Criteria for BWR Fuel Designs," describing the criteria used by Siemens Power Corporation (SPC) to design boiling-water reactor (BWR) fuel assemblies. The ATRIUM-10 mechanical design has been analyzed according to these generic mechanical design criteria, as applicable to Conditions 3 and 4.

SPC mechanical design calculations using the above NRC-approved criteria demonstrate that ATRIUM-10 fuel complies with the criteria applicable to Conditions 3 and 4.

This plant-specific application of the NRC-approved criteria has been found acceptable by the staff for Condition 5 under a previous amendment and is found acceptable for Conditions 3 and 4.

Shutdown Margin

The Susquehanna TS establishes that the shutdown margin be calculated for a coolant temperature of 68 degrees F and this is applicable for Conditions 3 and 4. Shutdown margin, as discussed in the licensee's submittal, 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 degrees F and at zero Xenon poison concentration. PP&L stated in its submittal that it has used the NRC-approved methodology listed in TS Section 6.9.3.2 (Topical Reports 3[1] and 21[2]) to calculate the core shutdown margins in Conditions 3 and 4 for the final core configuration that exists currently in the plant. In addition, the licensee imposed an additional conservatism in its calculation by assuming a lower core Cycle 8 energy value, which makes the current core loading more reactive. The licensee's results reflect a calculated core shutdown margin for the beginning of cycle core loading, which is greater than 1.00% delta k/k. This value exceeds the TS value of 0.38% delta k/k. The staff finds that this shutdown margin is acceptable and under Conditions 3 and 4, that there is assurance that the core will continue to be maintained subcritical even with the strongest worth control rod withdrawn.

Consideration of Higher Pressures

The licensee, in its submittal, also discussed the fact that it considered the potential of an unplanned blowdown at pressures corresponding to Conditions 3 or 4, which are higher than that in Condition 5. The reactor would still remain subcritical and no adverse consequences would result. The staff finds that in the event of a blowdown of the vessel, the mechanical fuel design would accommodate the rapid pressure reduction, and the plant would still be able to be maintained in a safe condition with no accumulation of fission products in the fuel.

Based on the above information, the staff has concluded that operating the

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[1]PL-NF-90-001-A, "Application of Reactor Analysis Methods for BWR Design and Analysis," July 1992.

[2]PL-NF-90-001, Supplement 2, "Application of Reactor Analysis Methods to BWR Design and Analysis; CASMO-3G Code and ANFB Critical Power Correlation."

plant in Conditions 3 and 4 is acceptable based on the approved-mechanical design of the fuel, the maintenance of the reactor in a subcritical mode, and the existing shutdown margin. The outstanding issues for the review of the December 18, 1996 submittal deal with the correlation between reactor coolant flow and power levels at low flow with the reactor critical and in condition 2 (startup) or 1 (operation). Thus, approval of this amendment is not dependent upon or related to the approval of the December amendment request, since in Conditions 3 and 4 the reactor is subcritical and at 0 power level.

3.0 STATEMENT OF EXIGENT CIRCUMSTANCES

In the April 16, 1997, submittal, as supplemented by letter dated April 18, 1997, the licensee stated that this amendment request was precipitated by the unanticipated delay in the review and approval of the December 18, 1996, submittal. The continued delay in the approval threatens the licensee's ability to complete the Unit 2 8th refueling and inspection outage as planned and return Unit 2 to full operation. The licensee had planned to have the plant enter Condition 4 on April 19, 1997.

PP&L noted that the need for the present TS change had arisen as a result of the NRC's conclusion that approval of the December 18 amendment request necessitated an inspection at SPC. Issues relating to the analytical basis for the use of ATRIUM-10 fuel related to the American Nuclear Fuels-B correlation were identified during a February inspection at SPC and have caused an unanticipated delay in the completion of the NRC's review of the December 18 amendment request. In addition, the staff requested the licensee to provide additional information related to safety limits in a public meeting on March 26, 1997, and in a Request for Additional Information dated April 9, 1997. The staff believes that the licensee could not have anticipated the most recent NRC questions concerning the SPC analytical disposition of flow/power correlation concerns. PP&L has completed all planned refueling and maintenance activities for the outage and awaits staff's approval of the December 1996 amendment request.

Based on the above, the Commission finds that exigent circumstances exist and that the provisions of 10 CFR 50.91(a)(6) apply. The licensee and the Commission must act quickly and time does not permit publication of a Federal Register notice allowing 30 days for prior public comment. Instead, as detailed below, notice was published in local media in the area surrounding the plant and subsequent public comments were received and considered pursuant to 10 CFR 50.91(a)(6)(i-ii). As discussed in Section 5, the Commission has determined that the amendment involves no significant hazards considerations. The Commission also finds, pursuant to 10 CFR 50.91(a)(6)(vi), that the licensee did not create the exigency to avoid the normal notice and comment process.

Accordingly, the Commission published a public notice of the proposed amendment, issued a proposed finding of no significant hazards consideration and requested that any comments on the proposed no significant hazards consideration be provided to the staff by the close of business on April 24,

1997, pursuant to 10 CFR 50.91(a)(6). This notice was published in the Wilkes-Barre Times Leader and in the Berwick Press Enterprise on April 22-24, 1997.

4.0 COMMENTS

During the comment period, the Commission received telephone calls from six individuals. The following is a summary of the comments that were received.

One set of comments not related to the subject matter of the proposed amendment dealt with the effectiveness of the NRC's routine process to inform the public of regulatory actions at Susquehanna. These comments included the following: (1) it is difficult for the average person living near the plant to obtain copies of the Federal Register; (2) many people do not have access to the internet and the NRC Web Page; (3) the local public document room (LPDR) currently is located in a library in Wilkes-Barre, some 35 miles from the plant, and should be located either at the Berwick or Bloomsburg libraries; (4) the recent notice in the Berwick Press Enterprise was located in the back section of the newspaper where most people do not usually search for information; and (5) the NRC should hold its public meetings in the Berwick area rather than in Rockville, Maryland. In response to Comment #3, the staff is pursuing options for having licensing information available to the public in an additional public library that is closer to the Susquehanna plant than the current LPDR in Wilkes-Barre. These comments did not affect the no significant hazards consideration determination.

Two individuals stated that the licensee had decided to use the new type of fuel to merely increase stockholders' dividends. Another comment was that the licensee routinely makes changes to the plant without informing the public. These comments do not directly relate to the subject amendment request and did not affect the no significant hazards consideration determination.

One comment from an individual was a request that the NRC completely review the new fuel design to ensure that it is as safe as the current fuel. Another individual voiced opposition to the use of the new fuel in the reactor unless there was assurance that there would be no increase in risk to the public given an accident and another person criticized the NRC's finding (as described in the notice in the newspapers) that the use of ATRIUM-10 fuel in the reactor for Conditions 3 and 4 will not significantly increase the probability or consequences of an accident previously analyzed. A third comment made by two individuals was a concern that the use of the new fuel could potentially result in more radiation being released after an accident than compared with that which could be released by an accident with the current reactor fuel loaded. The NRC staff is currently conducting an in-depth review of the December 18, 1996 submittal and supporting analyses which will address the safe operation of the new fuel under all operational conditions. The licensee will not be able to start up the reactor and reach power operation until this NRC evaluation is completed and an amendment is issued. These comments will be further considered by the staff in the safety evaluation addressing the use of ATRIUM fuel in all operational conditions, as

requested by the licensee in its December 18, 1996 submittal. However, these comments did not affect the no significant hazards consideration determination for the amendment for use of the fuel only in Conditions 3 and 4 because the reactor in these conditions will remain subcritical, remain at 0 power level and will be subject to a limited number of potential accidents with impacts that are bounded by approved staff criteria and analyses as discussed above in this safety evaluation.

Another comment was that the licensee had recently fired a number of operators and was undergoing downsizing. The commenter wanted to be sure that the plant was operated in a safe manner. The staff is aware of the licensee's downsizing and was informed about the circumstances precipitating the firing of PP&L employees. The staff has determined that the above actions have not affected the safe operation of the plant. Further, the comment is not related to the amendment addressed in this safety evaluation.

Another comment unrelated to the subject amendment was that the licensee had on two occasions in public meetings "promised" that no nuclear waste would ever be stored on site. Subsequently, within about a year after startup, the licensee built a large low level waste storage facility on site and the commenter indicated that the licensee could not be trusted. Based on the staff's review of the licensee's information supporting this current amendment, the staff has no reason to believe that it may not rely upon this information to issue this requested amendment.

One person stated that he had no problems or concerns about the proposed license amendment and fully supported nuclear power.

5.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission has provided standards for determining whether a significant hazards consideration exists (10 CFR 50.92(c)). A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

The following evaluation was provided by PP&L:

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 [Final Safety Analysis Report] 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 [Unit 2 Cycle 9] 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 [21]). 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. [As of this date, ATRIUM™-10 has been shown to comply with the approved design criteria for

Conditions 3, 4, and 5. The staff's approval is pending for the use of the criteria for Conditions 1 (operations) and 2 (startup).] 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% [delta k/k] and the mechanical design meets the NRC approved criteria in Technical Specification Section 6.9.3.2 (Topical Report #22 [21]). 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% [delta k/k] and the mechanical design meets the NRC approved criteria in Technical Specification Section 6.9.3.2 (Topical Report #22 [21]). 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.

The NRC staff has reviewed the licensee's analysis and, as discussed above, considered the potential effects of an unplanned blowdown to be adequately accommodated by the mechanical design of the ATRIUM-10 fuel in Conditions 3 and 4. Based on this review, it appears that the three standards of 10 CFR 50.92(c) are satisfied. The Commission has considered the public's comments and finds that the amendment request involves no significant hazards consideration.

6.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendment on April 17, 1997. The State official had no comments.

7.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has found that the amendment involves no significant hazards consideration. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

8.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: C. Poslusny
H. Richings

Date: April 25, 1997