November 10, 2005

Mr. Britt T. McKinney
Sr. Vice President and
Chief Nuclear Officer
PPL Susquehanna, LLC
769 Salem Blvd., NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1 - ISSUANCE OF AMENDMENT REGARDING MINIMUM CRITICAL POWER RATIO SAFETY LIMIT (TAC NO. MC8626)

Dear Mr. McKinney:

The Commission has issued the enclosed Amendment No. 227 to Facility Operating License No. NPF-14 for the Susquehanna Steam Electric Station, Unit 1 (SSES-1). This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated October 14, 2005, as supplemented by your letters dated October 21 and November 2, 2005.

This amendment changes the SSES-1 TSs by revising the SSES-1 Cycle 14 Minimum Critical Power Ratio Safety Limit in Section 2.1.1.2. These changes were requested due to a mid-cycle core redesign necessitated by planned actions to resolve control cell friction issues at SSES-1.

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

Sincerely,

/RA/

Richard V. Guzman, Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-387

Enclosures: 1. Amendment No. 227 to License No. NPF-14
2. Safety Evaluation

cc w/encls: See next page

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RGuzman SLittle GHill (2) OGC JTrapp, RGN-1 DLPM DPR

***** SE provided. No major changes made.
ADAMS Accession No.: ML053120393

OFFICE	NRR/LPLI-1/PM	NRR/LPLI-1/LA	NRR/SNPB/BC	OGC	NRR/LPLI-1/BC
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DATE	11/9/05	11/9/05	11/8/05 SE DTD	11/9/05	11/10/05

Susquehanna Steam Electric Station, Units 1 and 2

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PPL SUSQUEHANNA, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-387

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 227
License No. NPF-14

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

   A. The application for the amendment filed by PPL Susquehanna, LLC, dated October 14, 2005, as supplemented by letters dated October 21 and November 2, 2005, 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-14 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. 227 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. PPL Susquehanna, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Richard J. Laufer, Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: November 10, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 227

FACILITY OPERATING LICENSE NO. NPF-14

DOCKET NO. 50-387

Replace the following page of the Appendix A Technical Specification with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

REMOVE	INSERT
TS/2.0-1	TS/2.0-1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 227 TO FACILITY OPERATING LICENSE NO. NPF-14

PPL SUSQUEHANNA, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

DOCKET NO. 50-387

1.0 INTRODUCTION

By application dated October 14, 2005, Agencywide Documents Access and Management System (ADAMS) Accession No. ML053040074, as supplemented by letters dated October 21 (ML053050404) and November 2, 2005, PPL Susquehanna, LLC, (PPL, the licensee), requested changes to the Technical Specifications (TSs) for Susquehanna Steam Electric Station, Unit 1 (SSES-1) due to a mid-cycle core redesign necessitated by planned actions to resolve control cell friction issues.

The supplemental letters dated October 21 and November 2, 2005, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the Nuclear Regulatory Commission (NRC) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on October 24, 2005 (70 FR 61475).

The proposed changes would revise the SSES-1 Cycle 14 (U1C14) Minimum Critical Power Ratio (MCPR) Safety Limit in Section 2.1.1.2. PPL's plan for the associated core redesign involves re-channelling up to 77 fuel assemblies. In addition, 56 fuel assemblies are projected for discharge. The 56 previously discharged, twice burned fuel assemblies will be reinserted as follows: 32 fuel assemblies initially loaded in Unit 1 Cycle 13, and 24 fuel assemblies initially loaded in Unit 1 Cycle 12. The redesigned core (U1C14A) has 764 fuel assemblies, of which there are 280 initial U1C14 fresh ATRIUM-10 bundles, 284 once-burned ATRIUM-10 bundles, 144 twice-burned ATRIUM-10, and 56 twice-burned reinserted ATRIUM-10 bundles.

2.0 REGULATORY EVALUATION

2.1 Regulatory Requirements

The regulatory requirements and guidance which the NRC staff considered in its review of the application are as follows:

1. Title 10 of the *Code of Federal Regulations* (10 CFR) establishes the fundamental regulatory requirements with respect to the reactivity control systems. Specifically, General Design Criterion 10 (GDC-10), "Reactor design," in Appendix A, "General

Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 states, in part, that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded.

2. NRC Generic Letter 88-16 (GL 88-16), “Removal of Cycle-Specific Parameter Limits from Technical Specifications,” provides guidance on modifying cycle-specific parameter limits in the TSs.

3. NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants,” provides guidance on the acceptability of the reactivity control systems, the reactor core, and fuel-system design. Specifically, Section 4.2, “Fuel System Design,” specifies the criteria for evaluation of fuel-design limits such that there be at least 95% probability at a 95% confidence level that the hot fuel rod in the core does not experience a departure from nucleate boiling or a transition condition during normal operation or anticipated operational occurrences. Section 4.4, “Thermal Hydraulic Design,” provides guidance on the review of thermal-hydraulic design in meeting the requirement of GDC-10 and the fuel-design criteria established in Section 4.2.

3.0 TECHNICAL EVALUATION

3.1 Proposed Change to MCPR Safety Limit

PPL proposed to change the MCPR safety limit values in TS 2.1.1.2 for U1C14 operation from 1.08 to 1.09 for two-recirculation loop operation. PPL provided an adequate description of the approved methodologies used to calculate the MCPR safety limit value for the proposed TS change in the October 14, 2005, submittal. The U1C14A MCPR safety limit analysis was performed by Framatone Advanced Nuclear Power (FANP) using SSES-1, plant-and cycle-specific fuel and core parameters including power profiles provided by PPL as well as NRC approved methods including: (1) ANF-524 (P)(A), Revision 2, “Critical Power Methodology for Boiling Water Reactors,” Supplement 1, Revision 2, and Supplement 2; (2) EMF-1997 (P)(A), Revision 0, “ANFB-10 Critical Power Correlation,” and Supplement 1, Revision 0; and (3) EMF-2158 (P)(A), Revision 0, “Siemens Power Corporation Methodology for Boiling Water Reactors: Evaluation and Validation of CASMO-4/MICROBURN-B2.” In order to provide additional margin to the MCPR safety limit, PPL elected to double the amount of channel bow previously accepted in the approved FANP methods. A factor of 2 results in a modest increase in the MCPR safety limit of 0.01 for the balance of U1C14A. PPL provided confirmation that all channels used for the balance of the cycle are within the analysis assumptions.

The NRC staff has reviewed PPL’s justification for the proposed MCPR safety limit value of 1.09 for two recirculation loop operation using NRC-approved methodologies. Based on the NRC staff’s review of PPL’s application dated October 14, 2005, the supplemental information dated October 21 and November 2, 2005, and the information provided in an October 12, 2005 presentation (ADAMS accession no. ML052980239), the NRC staff has concluded that PPL has adequately addressed the issues with respect to: (1) the U1C14A core redesign and the criteria used for reinserting twice burned fuel bundles, (2) conservatism of assumed bow twice the FANP database, (3) deviation from General Electric (GE) report SC05-06, ”Updated Surveillance Program for Fuel Channel-Control Blade Interference Monitoring”, and (4) the fuel

assembly inspection program planned for the mid-cycle outage as well as the follow-on pool-side inspection program prior to Cycle 15. Therefore, the proposed MCPR safety limit value and its analysis for U1C14A operation using the plant- and cycle-specific calculations in conjunction with the approved methods is acceptable. The U1C14A MCPR safety limit will ensure that 99.9% of the fuel rods in the core will not experience boiling transition, which satisfies the requirements of GDC-10 of Appendix A to 10 CFR Part 50 regarding acceptable fuel design limit. The NRC staff has concluded that the justification for analyzing and determining the MCPR safety limit value of 1.09 for two recirculation loop operation for U1C14A is acceptable.

3.2 Fuel Channel Surveillance

Global Nuclear Fuel (GNF) and GE Nuclear Energy issued a channel management action plan, SC05-06, on July 14, 2005, for provided revised surveillance program recommendations to identify the population channels and control cells that could potentially develop elevated friction levels due to channel-control blade interference. Since it does not use GE fuel, PPL adopted its own action plan based on an earlier GNF action plan, SC03-09, issued in May 2003. PPL's action plan consists of susceptible cell determination and test methods. A control cell may belong to a susceptible population when (1) fuel within the cell has a burnup and early life control history exceeding a specified limit, or (2) observation of cell friction during normal use or scram testing. If a cell is identified to have interference, all symmetrical cells are included in the susceptible population. The test method involves stroke ratio testing to determine control cell interference as recommended in GNF SC05-06.

The NRC staff has reviewed PPL's fuel channel surveillance and has determined that PPL's approach is consistent with the GNF recommendation. Based on the consistency, the NRC staff concludes that PPL's fuel channel surveillance is acceptable.

3.3 Fuel Inspection

During the mid-cycle outage, PPL will perform channel bow measurements. PPL plans to use the ultrasonic transducers of the AREVA fuel channel characterization machine to take accurate measurements of channel bulge and bow. The results of the bow measurements form the basis to re-channel or discharge the fuel assemblies.

PPL established threshold criteria for re-channeling and/or re-inserting the fuel assemblies. PPL plans to use new channels in place of re-channeled assemblies. For the re-inserted twice burned fuel, PPL completed the bow measurements and determined that the degrees of bow were consistent with the threshold criteria.

The NRC staff has reviewed the fuel inspection plan and has determined that the inspection scope was adequate for channel bow measurements. Based on the adequacy, the NRC staff concludes that PPL's fuel inspection plan is acceptable for bow measurements.

4.0 EXIGENT CIRCUMSTANCES

The NRC staff has made a determination that exigent circumstances exist with regard to issuance of a license amendment, in response to the licensee's application dated October 14, 2005, as supplemented by letters dated October 21 and November 2, 2005, as

defined in 10 CFR 50.91(a)(6). In this regard, the licensee recently determined, based in part on testing performed the weekend of September 30, 2005, that a mid-cycle core redesign was the most prudent course of action to resolve control cell friction issues and ensure safe, reliable operation for the remainder of the current operating cycle for SSES-1. The licensee expeditiously submitted an amendment application to revise the MCPR safety limit due to the control friction issues which necessitated a U1C14 mid-cycle core redesign and unit shutdown to implement. Additionally, the licensee's request on an exigent basis was necessary to avoid unnecessary delays in unit restart following the forced maintenance outage.

5.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulation's in 10 CFR 50.92 state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility, in accordance with the 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 previously evaluated, or (3) involve a significant reduction in a margin of safety. As required by 10 CFR 50.91(a), the licensee has provided its analysis of the issue of no significant hazards consideration, which is presented below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The proposed change to the MCPR Safety Limits does not directly or indirectly affect any plant system, equipment, component, or change the processes used to operate the plant. Further, the revised U1C14 MCPR Safety Limits are generated using NRC approved methodology and meet the applicable acceptance criteria. In addition, the effects of channel bow were conservatively addressed by increasing the amount of channel bow assumed in the MCPR SL calculation. Thus, this proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   Prior to the restart of U1C14, licensing analyses will be performed on the redesigned core (using NRC approved methodology referenced in Technical Specification Section 5.6.5.b) to determine changes in the critical power ratio as a result of anticipated operation occurrences. These results will be added to the MCPR Safety Limit values proposed herein to generate the MCPR operating limits in the U1C14 Core Operating Limits Report (COLR). The COLR operating limits thus assure that the MCPR Safety Limit will not be exceeded during normal operation or anticipated operational occurrences. Postulated accidents are also analyzed to confirm NRC acceptance criteria are met.

   Therefore, this proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

This proposed change to the MCPR Safety Limits does not directy or indirectly affect any plant system, equipment, or component and therefore they do not affect the failure modes of any of these items. Thus, the proposed change does not create the possibility of a previously unevaluated operator error or a new single failure.

Therefore, this proposed amendment does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

Since the proposed change does not alter any plant system, equipment, component, or the processes used to operate the plant, the proposed change will not jeopardize or degrade the function or operation of any plant system or component governed by Technical Specifications. The proposed MCPR Safety Limits do not involve a significant reduction in the margin of safety as currently defined in the Bases of the applicable Technical Specification sections, because the MCPR Safety Limits calculated for the remaining U1C14 operation preserve the required margin of safety.

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

Based on the above considerations, the NRC staff concludes that the amendment meets the three criteria of 10 CFR 50.92. Therefore, the NRC staff has made a final determination that the proposed amendment does not involve a 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. 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 made a final finding that the amendment involves no significant hazards consideration. Accordingly, the amendment meets the eligibility criteria for categorical exclusions 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 NRC staff has reviewed the request by PPL to revise the TS for the SSES-1 U1C14A mid-cycle operation. Based on the review, the NRC staff concludes that the revision of the MCPR safety limit value in TS 2.1.1.2 for the U1C14A operation from 1.08 to 1.09 for two-recirculation loop operation is acceptable.

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: T. Huang
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Date: November 10, 2005