January 29, 2002

Mr. Robert G. Byram
Senior Vice President
and Chief Nuclear Officer
PPL Susquehanna, LLC
2 North Ninth Street
Allentown, PA 18101

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT RE: SUPPRESSION CHAMBER-TO-DRYWELL VACUUM BREAKER SETPOINTS (TAC NOS. MB0634 AND MB0637)

Dear Mr. Byram:

The Commission has issued the enclosed Amendment No. 198 to Facility Operating License No. NPF-14 and Amendment No. 173 to Facility Operating License No. NPF-22 for the Susquehanna Steam Electric Station, Units 1 and 2. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated November 28, 2000.

These amendments expand the allowable suppression chamber-to-drywell vacuum breaker setpoint range.

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/

Daniel S. Collins, Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosures:
1. Amendment No. 198 to License No. NPF-14
2. Amendment No. 173 to License No. NPF-22
3. Safety Evaluation

cc w/encls: See next page

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Units 1 &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. 198
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 November 28, 2000, 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. 198 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/

Joel T. Munday, Acting Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: January 29, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 198

FACILITY OPERATING LICENSE NO. NPF-14

DOCKET NO. 50-387

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

REMOVE	INSERT
3.6-21	3.6-21

PPL SUSQUEHANNA, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-388

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 173
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 PPL Susquehanna, LLC, dated November 28, 2000, 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. 173 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/

Joel T. Munday, Acting Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: January 29, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 173

FACILITY OPERATING LICENSE NO. NPF-22

DOCKET NO. 50-388

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

REMOVE	INSERT
3.6-21	3.6-21

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 198 TO FACILITY OPERATING LICENSE NO. NPF-14

AND AMENDMENT NO. 173 TO FACILITY OPERATING LICENSE NO. NPF-22

PPL SUSQUEHANNA, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-387 AND 50-388

1.0 INTRODUCTION

By letter dated November 28, 2000, PPL Susquehanna, LLC (the licensee), submitted a request for changes to the Susquehanna Steam Electric Station (SSES), Units 1 and 2, Technical Specifications (TSs). The requested changes would expand the allowable suppression chamber-to-drywell vacuum breaker setpoint range. Specifically, the allowable vacuum breaker opening setpoint of TS surveillance requirement (SR) 3.6.1.6.3 would be revised from "$\geq$ 0.25 and $\leq$ .525 psid" to "$\geq$ 0.25 and $\leq$ .75 psid."

2.0 BACKGROUND

The containment systems for SSES Units 1 and 2 include a Mark II pressure suppression containment structure as the primary containment, and a secondary containment structure surrounding the primary containment and housing equipment essential to safe shutdown of the reactor, as well as fuel handling and storage facilities. The containment structures and associated systems are designed to control the release of airborne radioactive materials from the primary containment.

The primary containment is a steel-lined, reinforced concrete structure with an over-and-under configuration. The drywell is in the form of a truncated cone and is closed by a steel dome at the top. The drywell houses the reactor vessel, the reactor recirculation system, and associated primary system piping. The suppression chamber is in the shape of a cylinder and is located below the drywell. The drywell and suppression chamber are divided by a horizontal diaphragm slab of reinforced concrete structurally connected to the primary containment wall.

The suppression pool serves as a heat sink for postulated transients and accidents and as a source of cooling water for the emergency core cooling system. In the event of a loss-of-coolant accident (LOCA) within the drywell, the drywell atmosphere is vented to the suppression chamber through a series of vertical pipes (downcomers) with a nominal diameter of 24 inches. The downcomers extend from the drywell floor to the suppression pool and are submerged about 11 feet in the pool water. The downcomers channel the mass and energy released from

ENCLOSURE

a postulated break in the primary system from the drywell to the suppression pool, where the steam is condensed.

There are five assemblies consisting of pairs of vacuum breaker valves provided to equalize the pressure between the suppression chamber and the drywell after reactor blowdown and/or drywell spray actuation, while preventing bypass of the suppression pool during periods of blowdown. These vacuum breaker assemblies are attached to five downcomers that are closed at the bottom end by a cap with a 3-inch drain line. Four vacuum breaker assemblies are required to provide adequate vacuum relief capability to protect the structural integrity of the containment for all postulated events. The fifth assembly provides redundancy in the event that a single active failure prevents one valve in any of the required assemblies from opening.

3.0 EVALUATION

3.1 Licensee's Analysis

The licensee proposed to revise the allowable vacuum breaker opening setpoint of SR 3.6.1.6.3 from "≥ 0.25 and ≤ .525 psid" to "≥ 0.25 and ≤ .75 psid." The licensee stated that the original TS vacuum breaker opening setpoint was 0.5 psid +/- 5 % (0.475 psid to 0.525 psid). This set pressure was based on flow testing in which 1 psid was required across the valve system (i.e. two valves in series) for the valves to begin opening. The valve manufacturer assumed that the 1 psid across the valve system was equally shared by the two valves, i.e., 0.5 psid opening set pressure for each valve. Thus, the set pressure was established by the manufacturer during valve flow testing and was not analytically derived. The licensee stated that the basis for the 5% tolerance on the 0.5 psid nominal setpoint is unclear, but is believed to be based upon an estimate of the data scatter observed during manufacturer flow testing.

The current TS setpoint is ≥ 0.25 and ≤ .525 psid. The lower limit was expanded from 0.475 to 0.25 psid during the conversion of the SSES Units 1 and 2 TSs to the Improved Technical Specification format. That change was made to allow the valves to be set as low as possible below the maximum of .525 psid. The licensee stated that the change to 0.25 psid was justified and approved on the basis that the new range fell within the allowance/assumptions of the event analysis.

The licensee indicated that significant margin exists between the opening pressure assumed in the accident analysis and the current acceptance criteria in the SR. The containment depressurization analysis for the limiting transient (inadvertent drywell spray actuation) assumed that the vacuum breakers begin to open at a wetwell-to-drywell pressure of 2.81 psid. The licensee stated that this value includes a differential pressure of 1.8 psid across the valve assembly (0.9 psid across each valve) when the valve begins to open. The difference between the wetwell-to-drywell pressure differential and the pressure differential across the valve assembly is due to additional flow losses in the wetwell-to-drywell flow path assumed in the analysis.

The licensee stated that the actual valve performance history and setpoint adjustment procedures provide additional conservatism. A review of recent test history for both units revealed that no vacuum breaker has had an as-found set pressure of greater than 0.6 psid (representing a 50% margin to the analysis assumption value of 0.9 psid). Furthermore, most SR failures due to a high opening differential pressure have occurred at less than 0.55 psid, just

slightly above the present acceptance value. The licensee stated that work practices direct that the valves be adjusted to achieve an opening differential pressure setpoint of less than 0.5 psid when adjustments are made to the valves. Thus, based upon past performance and current maintenance practices, valve performance is expected to be unaffected by the proposed change and is expected to be much lower than the upper limit proposed by this change.

With respect to the effect of the proposed change on the vacuum breakers' structural integrity, the licensee indicated that the worst-case structural effects on the vacuum breaker occur during the post-LOCA suppression pool swell event. At the start of a postulated LOCA, the steam from the break purges the air from the drywell into the wetwell airspace through the downcomers. This drywell purging produces the phenomenon known as pool swell. In addition to the actuation of the vacuum breakers during the LOCA depressurization phase, the vacuum breakers may actuate during pool swell early in the postulated LOCA. The wetwell pressure could exceed the drywell pressure sufficiently for a short period of time during pool swell so as to actuate the vacuum breakers. During pool swell, rapid valve actuation subjects the disc assembly to opening and closing impact loads. The licensee stated that the increased setpoint tolerance does not result in a torque on the shaft due to the disc that exceeds the analysis, the shaft is not adversely affected by the torsional loading associated with the setpoint change; and the shaft will not yield due to bending and torque combined.

3.2 Nuclear Regulatory Commission (NRC) Staff's Evaluation

The staff reviewed the licensee's submittal, Sections 6.2.1.1.3.2 and 6.2.1.1.4 of the SSES Final Safety Analysis Report, and Section 6.2.1.5 of NUREG-0776, "Safety Evaluation Report Related to the Operation of Susquehanna Steam Electric Station, Units 1 and 2," April 1981 (SER). The staff verified that the assumptions regarding wetwell-to-drywell differential pressure assumed in the analysis of the limiting transient (inadvertent drywell spray actuation) bound the proposed setpoint tolerance. Therefore, the NRC staff concludes that the proposed change will not affect the results of the drywell negative pressure or diaphragm upload pressure analyses.

The staff reviewed the licensee's submittal and Section 6.2.1.8.h of SER Supplement 6, dated March 1984, which provided the NRC staff's review of the licensee's analysis of impact velocities and loads on the vacuum breakers due to post-LOCA suppression pool swell. The SSES Units 1 and 2 impact velocities were found to be lower than those found to be acceptable for other boiling water reactor facilities with Mark II containments, due to additional design features of the SSES Units 1 and 2 vacuum breakers that provide additional damping, and were, therefore, found to be acceptable. Based on the licensee's analysis and the favorable design features of the SSES Units 1 and 2 vacuum breakers that limit impact velocities and loads, the NRC staff concludes that the proposed change will not adversely affect the structural integrity of the vacuum breakers.

Based on its review of the information provided by the licensee and the applicable design and licensing basis documentation, the NRC staff concludes that the previously approved design basis vacuum breaker differential pressure opening values continue to bound the proposed vacuum breaker setpoint tolerance values. Sufficient margin remains between the proposed setpoint tolerance and the design analysis value to ensure the design drywell negative pressure and diaphragm upload values will not be exceeded. Actual vacuum breaker performance history data indicates that as-found vacuum breaker opening setpoints remain well below the design analysis value. Furthermore, plant procedures direct that the vacuum breaker opening

setpoints be adjusted to less than 0.5 psid when adjustments are made, providing additional margin to the design analysis value. Finally, the proposed change will not adversely affect the structural integrity of the vacuum breakers. Based on the foregoing evaluation, the NRC staff finds that the proposed change to TS SR 3.6.1.6.3 is acceptable.

The applicable TS Bases will be updated by the licensee in accordance with TS 5.5.10, "Technical Specifications (TS) Bases Control Program." Marked-up Bases pages were provided for information to reflect the TS Bases changes the licensee intends to implement.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change the surveillance requirements. The NRC staff has determined that the amendments involve 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 previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (66 FR 2023). Accordingly, the amendments meet 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 amendments.

6.0 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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: R. Schaaf

Date: January 29, 2002

January 29, 2002

Mr. Robert G. Byram
Senior Vice President
and Chief Nuclear Officer
PPL Susquehanna, LLC
2 North Ninth Street
Allentown, PA 18101

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT RE: SUPPRESSION CHAMBER-TO-DRYWELL VACUUM BREAKER SETPOINTS (TAC NOS. MB0634 AND MB0637)

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Sincerely,

/RA/

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ACCESSION NO. ML020030303 *See previous concurrence

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