June 1, 199

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

SUBJECT: CHANGES TO TURBINE OVERSPEED PROTECTION SYSTEM, SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 (TAC NOS. M86403 AND M86404)

Dear Mr. Byram:

The Commission has issued the enclosed Amendment No. 146 to Facility Operating License No. NPF-14 and Amendment No. 116 to Facility Operating License No. NPF-22 for the Susquehanna Steam Electric Station, Units 1 and 2. These amendments are in response to your letter dated April 30, 1993.

These amendments delete Technical Specification Section 3/4.3.8, Turbine Overspeed Protection System. The testing and maintenance requirements will be maintained in an administrative program to ensure the performance of periodic testing and maintenance in line with vendor recommendations. Based on the Commission's approval of this amendment, the request for amendments to change the main turbine valve surveillance interval dated November 11, 1994, should be withdrawn.

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 Nos. 50-387/50-388
Enclosures:
1. Amendment No. 146 to License No. NPF-14
2. Amendment No. 116 to License No. NPF-22
3. Safety Evaluation

cc w/encls:
See next page

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

June 1, 1995

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

PENNSYLVANIA POWER & LIGHT COMPANY

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-387

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 146
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 the Pennsylvania Power & Light Company, dated April 30, 1993, 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. 146 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 its date of issuance and is to be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

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: June 1, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 146

FACILITY OPERATING LICENSE NO. NPF-14

DOCKET NO. 50-387

Replace the following pages of the Appendix A Technical Specifications with enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

REMOVE	INSERT
3/4 3-94	3/4 3-94
B 3/4 3-7	B 3/4 3-7

3/4.3.8 TURBINE OVERSPEED PROTECTION SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.8 ***DELETED***

3/4.3.8 TURBINE OVERSPEED PROTECTION SYSTEM

DELETED

3/4.3.9 FEEDWATER/MAIN TURBINE TRIP SYSTEM ACTUATION INSTRUMENTATION

The feedwater/main turbine trip system actuation instrumentation is provided to initiate action of the feedwater system/main turbine trip system in the event of failure of feedwater controller under maximum demand.

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. 116
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 30, 1993, 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. 116 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 its date of issuance and is to be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

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: June 1, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 116

FACILITY OPERATING LICENSE NO. NPF-22

DOCKET NO. 50-388

Replace the following pages of the Appendix A Technical Specifications with enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

REMOVE	INSERT
3/4 3-94	3/4 3-94
B 3/4 3-7	B 3/4 3-7

3/4.3.8 TURBINE OVERSPEED PROTECTION SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.8 ***DELETED***

3/4.3.8 TURBINE OVERSPEED PROTECTION SYSTEM

DELETED

3/4.3.9 FEEDWATER/MAIN TURBINE TRIP SYSTEM ACTUATION INSTRUMENTATION

The feedwater/main turbine trip system actuation instrumentation is provided to initiate action of the feedwater system/main turbine trip system in the event of failure of feedwater controller under maximum demand.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 146 TO FACILITY OPERATING LICENSE NO. NPF-14

AMENDMENT NO. 116 TO FACILITY OPERATING LICENSE NO. NPF-22

PENNSYLVANIA POWER & LIGHT COMPANY

ALLEGHENY ELECTRIC COOPERATIVE, INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-387 AND 388

1.0 INTRODUCTION

By letter dated April 30, 1993, the Pennsylvania Power and Light Company (PP&L or the licensee) submitted a request for changes to the Susquehanna Steam Electric Station (SSES), Units 1 and 2, Technical Specifications (TS). The requested changes would revise the TS to delete the requirements in Section 3/4.3.8 of the Turbine Overspeed Protection System. Specifically, the amendments would: (1) delete the Limiting Condition for Operation in Section 3/4.3.8 that the turbine overspeed system be in operation, (2) delete the surveillance requirements in Section 4.3.8, and (3) delete the Bases for Section 3/4.3.8. The licensee stated that the testing and maintenance requirements will be maintained in an administrative program, and testing and maintenance of the overspeed system will be continued in line with General Electric (GE) recommendations, as set forth in the SSES Final Safety Analysis Report (FSAR).

Section 182a of the Atomic Energy Act (the "Act") requires applicants for nuclear power plant operating licenses to state TS to be included as part of the license. The Commission's regulatory requirements related to the content of TS are set forth in 10 CFR 50.36. That regulation requires that the TS include items in five specific categories, including (1) safety limits, limiting safety system settings and limiting control settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; and (5) administrative controls. However, the regulation does not specify the particular requirements to be included in a plant's TS.

The Commission has provided guidance for the contents of TS in its "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors" ("Final Policy Statement"), 58 FR 39132 (July 22, 1993), in which the Commission indicated that compliance with the Final Policy Statement satisfies Section 182a of the Act. In particular, the Commission indicated that certain items could be relocated from the TS to licensee-controlled documents, consistent with the standard enunciated in *Portland General Electric Co.* (Trojan Nuclear Plant), ALAB-531, 9 NRC 263, 273 (1979). In that

case, the Atomic Safety and Licensing Appeal Board indicated that "technical specifications are to be reserved for those matters as to which the imposition of rigid conditions or limitations upon reactor operation is deemed necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety."

Consistent with this approach, the Final Policy Statement identified four criteria to be used in determining whether a particular matter is required to be included in the TS, as follows: (1) Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary; (2) a process variable, design feature, or operating restriction that is an initial condition of a Design Basis Accident or Transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier; (3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a Design Basis Accident or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier; (4) a structure, system, or component which operating experience or probabilistic safety assessment has shown to be significant to public health and safety.[1] As a result, existing TS requirements which fall within or satisfy any of the criteria in the Final Policy Statement must be retained in the TS, while those TS requirements which do not fall within or satisfy these criteria may be relocated to other, licensee-controlled documents.

2.0 EVALUATION

The current TS 3/4 3.8 requires that the turbine overspeed protection system be operable. In addition, the TS requires weekly testing of the Stop Valves, Control Valves, and Combined Intermediate Valves (CIVs) associated with the main turbine, 18-month channel calibration of the Turbine Overspeed Protection System instrumentation, and 40-month disassembly and inspection of one of each of the above valves. A reduction of power level is required when performing the weekly testing of the turbine valves. The testing is routinely scheduled each weekend because power demands are generally lower than during the week.

Each turbine generator for Susquehanna, Units 1 and 2, was manufactured by GE. Each one is a tandem-compound type (single shaft) with one double-flow high pressure turbine and three double-flow low pressure turbines. The rotational speed is 1800 rpm and is designed for a gross generator output of 1085 MWe at

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[1] The Commission recently promulgated a proposed change to 10 CFR 50.36, pursuant to which the rule would be amended to codify and incorporate these criteria (59 FR 48180, September 20, 1994). The Commission's Final Policy Statement specified that the Reactor Core Isolation Cooling, Isolation Condenser, Residual Heat Removal, Standby Liquid Control, and Recirculation Pump Trip are included in the TS under Criterion 4 (58 FR 39132, July 22, 1993).

a nominal plant exhaust pressure of 3.6 inches mercury (absolute). The turbine-generator is equipped with an electrohydraulic control (EHC) system. The EHC system consists of an electronic governor using solid state control techniques in combination with a high pressure hydraulic actuating system. The system includes electrical control circuits for steam pressure control, speed control, load control and steam control valve positioning.

The overspeed protection is accomplished by three independent systems: normal speed governor, mechanical overspeed, and electric backup overspeed control systems. The normal speed governor modulates the turbine control valves to maintain desired speed load characteristics and it will close the intercept valves and control valves at approximately 102 to 104 percent of rated speed and upon loss of the two independent redundant speed control channels. The mechanical overspeed sensor trips the turbine stop, control, and combined intermediate valves by de-energizing the hydraulic fluid systems when 110 percent of rated speed is reached. The stop valves close in 0.10 seconds, the control valves in 0.008 seconds. These valves are designed to fail closed on loss of hydraulic system pressures. The electrical backup overspeed sensor will trip these same valves when 112 percent of rated speed is reached by independently de-energizing the hydraulic fluid system. Both of these actions independently trip the energizing trip fluid system. The overspeed trip systems can be tested while the unit is on-line.

The turbine is equipped with control valves and stop valves which control turbine speed during normal plant operation and protect it from overspeed during abnormal conditions. The turbine overspeed protection system consists of separate mechanical and electrical sensing mechanisms which are capable of initiating fast closure of the turbine steam valves. No change in the operation, maintenance, and testing of the turbine/generator or the design function of the overspeed protection system is proposed by the licensee. As such, plant operation remains bounded by the existing safety analyses given in the Final Safety Analysis Report (FSAR).

In a separate TS change submittal dated November 11, 1994, (59 FR 65821) the licensee discussed the maintenance and test histories of turbine steam valves. A review of the performance history of Main Turbine Valve testing for the Stop, Control and Combined Intermediate Valves was performed by the licensee. The review found that there have been a few instances where the test circuitry required maintenance, but there has never been an occurrence where the valve would not have performed its function of closing per design for turbine overspeed protection. To date, the maintenance and test histories of the turbine valves have been satisfactory.

In a discussion with the staff, the licensee indicated that subject to the approval of this TS change, the existing surveillance procedure for turbine overspeed protection will be modified to delete the reference to TS 3/4.3.8. The procedure is conducted in accordance with the FSAR. Specifically FSAR Section 10.2.3.6.C controls the frequency of the testing. This FSAR section will also be amended to reflect the current applicable vendor guidance for the testing frequency. The NRC staff also notes that the proposed changes would allow SSES TS to be consistent with the guidance in the Standard Technical Specifications, General Electric Plants, BWR/4 (NUREG-1433) issued September 1992. NUREG-1433 does not provide TSs requiring the operability of a Turbine Overspeed Protection System, and the limiting conditions for operation and surveillance requirements for turbine overspeed controls were removed from the standard TS.

Although the SSES design basis accidents and transients include a variety of system failures and conditions which might result from turbine missiles striking various plant systems and equipment, the system failures and plant conditions could be caused by other events as well as turbine failures. In view of the low likelihood of turbine missiles, this scenario does not constitute a part of the primary success path to prevent or mitigate such design basis accidents and transients. Similarly, the turbine overspeed control is not part of an initial condition of a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Probabilistic safety assessments (PRA) and operating experience have demonstrated that proper maintenance of the turbine overspeed control valves is important to minimize the potential for overspeed events and turbine damage; however that experience has also demonstrated that there is low likelihood of significant risk to public health and safety because of turbine overspeed events. Further, the potential for, and consequences of turbine overspeed events are diminished by the licensee's inservice inspection program, which must comply with 10 CFR 50.55a, and a surveillance program for the turbine control and stop valves based on the manufacturer's recommendations.

In Section 10.2 of the "Safety Evaluation Report (SER) related to the operation of Susquehanna Steam Electric Station, Units 1 and 2," NUREG-0776, issued on April 1981, the staff reviewed the SSES turbine-generator overspeed protection system and concluded that the design was in conformance with the acceptance criteria in Section II of Standard Review Plan (SRP) 10.2 and industry standards, and the design was found to be acceptable. The SER noted that the risk due to potential turbine missiles for Susquehanna Units 1 and 2 is acceptable because of the low probability of turbine failure in conjunction with the even lower probability of damage to safety-related equipment from potential missile(s). In Section 3.5.1.3 of Supplement No. 2 to NUREG-0776, issued September 1981, the staff also provided an evaluation for the potential of turbine missile damage impacting the safe operation of the plant.

The Susquehanna turbine-generator placement and orientation is tangential with respect to the station reactor buildings; that is, the failure of the turbine could produce missiles which have trajectories that could impact certain safety areas of the plant. The staff has reviewed those portions of the reactor buildings within the low trajectory missile (LTM) strike zone and finds that the structures, systems, and components important to safety are adequately protected.

Since completion of the staff's SER analysis, the licensee has replaced the original keyway/shrunk-on disk designed low pressure turbine rotors with monoblock (solid disk) designed rotors. The monoblock design is less susceptible to turbine burst; and therefore, the risk due to potential turbine missiles is even lower than the original SER analysis reflected. The SSES FSAR has been updated to reference the rotor change and the lower failure probability associated with the current monoblock rotor design.

On this basis, the staff concludes that these requirements are not required to be in the TS under 10 CFR 50.36 or Section 182a of the Atomic Energy Act, are not necessary to provide adequate protection of the public health and safety, and are not required to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety. Further, they do not fall within any of the four criteria set forth in the Commission's Final Policy Statement, discussed above. In addition, the NRC staff finds that sufficient regulatory controls exist under 10 CFR 50.59 to address any future changes to these requirements in the FSAR. Accordingly, the staff has concluded that these requirements may be relocated from the TS to the administrative program. The NRC staff offers no objection to the deletion of the Bases associated with TS 3/4.3.8.

3.0 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.

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change 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 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 (58 FR 32389). 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.

5.0 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: T. Liu

Date: June 1, 1995