

August 15, 1995

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

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2  
(TAC NOS. M92000 and M92001)

Dear Mr. Byram:

The Commission has issued the enclosed Amendment No. 150 to Facility Operating License No. NPF-14 and Amendment No. 120 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 March 31, 1995, as supplemented by letter dated June 22, 1995.

These amendments delete from the Technical Specifications of each unit, the operational condition restriction in Surveillance Requirement 4.8.1.1.2.d.7, which requires that 24-hour emergency diesel generator testing be performed with at least one unit in operational condition 4 or 5 (cold shutdown or refueling).

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

Sincerely,  
original signed by  
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. 150 to License No. NPF-14
- 2. Amendment No. 120 to License No. NPF-22
- 3. Safety Evaluation

cc w/encls: See next page

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Pennsylvania Power & Light Company

Susquehanna Steam Electric Station,  
Units 1 & 2

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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. 150  
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 March 31, 1995, as supplemented by letter dated June 22, 1995, 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.

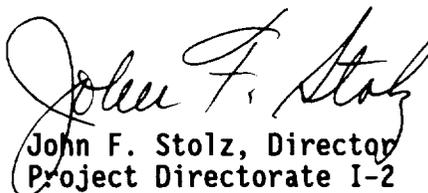
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of the Facility Operating License No. NPF-14 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 150 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 60 days after its date of issuance.

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: August 15, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 150

FACILITY OPERATING LICENSE NO. NPF-14

DOCKET NO. 50-387

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

3/4 8-5

INSERT

3/4 8-5

## **ELECTRICAL POWER SYSTEMS**

### **SURVEILLANCE REQUIREMENTS (Continued)**

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6. Simulating a loss-of-offsite power in conjunction with an ECCS actuation test signal, and:
  - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses.
  - b) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected loads through the load timers and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at  $4160 \pm 400$  volts and  $60 \pm 3.0$  Hz during this test.
  - c) Verifying that all automatic diesel generator trips, except engine overspeed, generator differential and engine low lube oil pressure, are automatically bypassed upon loss of voltage on the emergency bus concurrent with an ECCS actuation signal.
7. <sup>\*\*</sup> Verifying that the diesel generator operates for at least 24 hours. |  
<sup>\*\*\*</sup> During the first 2 hours of this test, the diesel generator shall be loaded to 4400-4700 kW and during the remaining 22 hours of this test, the diesel generator shall be loaded to 3800-4000 kW. The generator voltage and frequency shall be  $4160 \pm 400$  volts and  $60 \pm 3.0$  Hz within 10 seconds after the start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test.
8. Within 5 minutes of completing a one hour run at 3800 - 4000 Kw or within 5 minutes after operating temperatures have stabilized at a load of 3800 - 4000 Kw, verify the hot restart capability of the diesel by performing 4.8.1.1.2.a.4.
9. Verifying that the auto-connected loads to each diesel generator do not exceed the 2000-hour rating of 4700 kW.

**\*\*** Diesel generator loading may be preceded by a warmup period in accordance with vendor recommendations. Diesel generator loading may be accomplished in accordance with vendor recommendations.

**\*\*\*** This load is meant as guidance to avoid routine overloading of diesel generators. Momentary transients outside the load range will not invalidate the test.



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. 120  
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 March 31, 1995, as supplemented by letter dated June 22, 1995, 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. 120 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 60 days after its date of issuance.

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: August 15, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 120

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

3/4 8-5

INSERT

3/4 8-5

## **ELECTRICAL POWER SYSTEMS**

### **SURVEILLANCE REQUIREMENTS (Continued)**

---

6. Simulating a loss-of-offsite power in conjunction with an ECCS actuation test signal, and:

- a) Verifying deenergization of the emergency busses and load shedding from the emergency busses.
- b) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected loads through the load timers and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at  $4160 \pm 400$  volts and  $60 \pm 3.0$  Hz during this test.
- c) Verifying that all automatic diesel generator trips, except engine overspeed, generator differential and engine low lube oil pressure, are automatically bypassed upon loss of voltage on the emergency bus concurrent with an ECCS actuation signal.

<sup>\*\*</sup>  
7. Verifying that the diesel generator operates for at least 24 hours.

<sup>\*\*\*</sup>  
During the first 2 hours of this test, the diesel generator shall be loaded to 4400-4700 kW and during the remaining 22 hours of this test, the diesel generator shall be loaded to 3800-4000 kW. The generator voltage and frequency shall be  $4160 \pm 400$  volts and  $60 \pm 3.0$  Hz within 10 seconds after the start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test.

8. Within 5 minutes of completing a one hour run at 3800 - 4000 Kw or within 5 minutes after operating temperatures have stabilized at a load of 3800 - 4000 Kw, verify the hot restart capability of the diesel by performing 4.8.1.1.2.a.4.
9. Verifying that the auto-connected loads to each diesel generator do not exceed the 2000-hour rating of 4700 kW.

<sup>\*\*</sup> Diesel generator loading may be preceded by a warmup period in accordance with vendor recommendations. Diesel generator loading may be accomplished in accordance with vendor recommendations.

<sup>\*\*\*</sup> This load is meant as guidance to avoid routine overloading of diesel generators. Momentary transients outside the load range will not invalidate the test.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO.150 TO FACILITY OPERATING LICENSE NO. NPF-14  
AMENDMENT NO.120 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 March 31, 1995, as supplemented by letter dated June 22, 1995, the Pennsylvania Power and Light Company (the licensee) submitted a request for changes to the Susquehanna Steam Electric Station, Units 1 and 2, Technical Specifications (TS). The requested changes would delete from the TS of each unit the operational condition restriction in Surveillance Requirement 4.8.1.1.2.d.7, which requires that 24-hour emergency diesel generator testing be performed with at least one unit in operational condition 4 or 5 (cold shutdown or refueling). The June 22, 1995 letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination or expand the scope of the March 31, 1995 submittal as described in the Federal Register notice.

2.0 BACKGROUND

The Class 1E ac electrical system is divided into four load groups in each nuclear unit with three of the four groups required to supply the minimum safety loads. Each 4160-V switchgear of a load group is supplied by a preferred offsite power source and an alternate offsite power source and is backed up by an EDG that is shared with the corresponding load group in the other unit. If the preferred offsite source is lost, the 4160-V bus is automatically transferred to the alternate offsite source. If both offsite sources are lost, the EDG is connected to the bus. A fifth EDG is available as a substitute for any of the other four.

Currently, the plant's TS require that the operability of each EDG be demonstrated every 18 months by operating an EDG for 24 hours in parallel with an offsite source. Because of the vulnerability that exists while paralleling an onsite emergency source with an offsite source, the current TS restrict these specific tests to be performed only while at least one nuclear unit is in Mode 4 or 5. The testing of the fifth EDG is not subject to this restriction because it has an independent test bus.

The licensee has requested that this restriction be deleted from the TS to reduce the impact of the restriction on operations personnel during refueling and inspection outages because of scheduling conflicts and competing demands for operators' attention. The requested change meets the cost-beneficial licensing action criteria outlined in NRC Administrative Letter 95-02.

### 3.0 EVALUATION

The licensee has proposed the following specific change to the plants' TS:

CHANGE: Under Specification 4.8.1.1.2.d.7, delete "with at least one unit in OPERATIONAL CONDITION 4 or 5" from the first sentence.

The staff previously expressed concern about the performance of the 24-hour EDG load test with the EDG in parallel to the offsite power system. This concern, which is based on the common-mode vulnerability of the offsite and onsite sources during the test duration, led to restricting the performance of this test to shutdown modes as specified in plant-specific TS and Standard Technical Specifications.

If a fault or grid disturbance were to occur while an EDG is connected in parallel with the offsite system, the availability of the EDG for subsequent emergency operation may be affected. In some specific plant designs, the EDG could trip as a result of overcurrent, lock out, and require local operator action to restore the EDG to service. In other cases, such as during a loss of offsite power, the response of the division or plant may be delayed as a result of the EDG maintaining its bus voltage. Also, the EDG may be subjected to protective trips that may not be bypassed in test conditions as they are in emergency demand situations.

Recently, the staff has set aside the concerns associated with parallel operation during endurance testing for several plants. The acceptability of conducting the 24-hour endurance test while all associated nuclear units are at power was based on unique EDG design features and/or special provisions. Similar design features exist at Susquehanna:

- (1) On an accident signal, the EDG being tested will be separated from the offsite source by the tripping of its breaker and will be switched from droop to isochronous mode. If offsite power is available, the EDG continues to run in standby. If offsite power is not available, the EDG continues to run, but its corresponding bus is deenergized when the offsite feeder breakers open on undervoltage. The isolated bus then allows the EDG's output breaker to reclose, energizing the bus and carrying the accident loads for that load group.
- (2) On a loss of offsite power (LOOP) without an accident, the most likely scenario for the EDG being tested would begin with the associated bus breakers tripping on undervoltage because of voltage collapse below 65 percent. The EDG would be separated from the bus and reconnected if

the alternate offsite source is unavailable. A worst-case scenario exists, which begins with the bus voltage collapsing (but remaining above 67.3 percent). The EDG trips on overexcitation or underfrequency after a 10-second time delay. The associated bus is then isolated on undervoltage. The EDG receives an emergency start signal, which in turn bypasses the overexcitation or underfrequency trip. When the EDG comes up to speed, its output breaker closes and energizes the bus (with the 10-second delay being of no consequence). The worst-case scenario could also involve a bus lockout on overcurrent, requiring operator action if the voltage collapsed between 67.3 and 65 percent. This scenario is considered unlikely and would only involve a failure of one of the four load groups.

- (3) As previously stated, each load group bus has two separate sources of offsite power. During a conference call on May 24, 1995, the staff requested the licensee to consider aligning the bus used for the EDG test to one offsite source and all the other buses to the alternate offsite source. The normal lineup for the two units is to have half of a unit's 4.16-kV engineered safeguards buses on one offsite source and the other half on the opposite offsite source. The licensee desires to remain in this lineup during the 24-hour EDG test. Based on consideration of the vulnerabilities resulting from common-mode failures and induced transients resulting from going to and remaining in any abnormal lineup, the staff agrees with the use of the normal lineup during the test for this specific plant.

The plant also has the following special provisions:

- (1) During the 24-hour endurance test of the EDG, no other EDG is operated in parallel with the offsite power system. The remaining redundant load groups and their associated EDGs are available to adequately shut down the plant if the EDG being tested and the offsite sources are lost.
- (2) In a conference call on April 28, 1995, the licensee stated that Plant Procedure SE-024-A05, "18-Month Diesel Generator A 24 Hour Run and 4000 KW Load Rejection," Revision 4, contains cautions against conducting the EDG 24-hour endurance test during severe weather, unstable offsite grid conditions, or maintenance and test conditions that have an adverse effect on the test. Similar procedures with cautions exist for the other four EDGs. The conference call was followed up with two additional calls on May 17 and May 24, 1995, and a letter dated June 22, 1995, from the licensee that stated that the following additional prerequisites would be added to test procedures:
  - No maintenance or other testing will be performed or planned on required safety systems, subsystems, trains, components, and devices that depend on the remaining diesel generators as sources of emergency power.
  - The offsite power system will be within "single-contingency limits" (remain stable upon loss of any single component supporting the system) within the vicinity of the nuclear plant.

On the basis of these design features and provisions, the staff concludes that it is acceptable to perform the 24-hour EDG endurance test without either Susquehanna, Unit 1 or 2 in Mode 4 or 5.

#### 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 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 (60 FR 20523). 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: F. Burrows

Date: August 15, 1995