

February 12, 1997

Mr. George A. Hunger, Jr.  
Director-Licensing, MC 62A-1  
PECO Energy Company  
Nuclear Group Headquarters  
Correspondence Control Desk  
P.O. Box No. 195  
Wayne, PA 19087-0195

SUBJECT: LIMERICK GENERATING STATION, UNIT 2 (TAC NO. M97386)

Dear Mr. Hunger:

The Commission has issued the enclosed Amendment No. 87 to Facility Operating License No. NPF-85 for the Limerick Generating Station (LGS), Unit 2. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated December 6, 1996, as supplemented by letters dated January 15, and 28, 1997.

This amendment revises TS Section 2.1 and its associated TS Bases to reflect the change in the Minimum Critical Power Ratio Safety Limit due to the use of GE13 fuel product line and the cycle-specific analysis performed by General Electric Company (GE), for LGS, Unit 2, Cycle 5.

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/  
Frank Rinaldi, Project Manager  
Project Directorate I-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Docket No. 50-353

- Enclosures: 1. Amendment No. 87 to License No. NPF-85  
2. Safety Evaluation

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

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Sincerely,

A handwritten signature in cursive script that reads "Frank Rinaldi".

Frank Rinaldi, Project Manager  
Project Directorate I-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Docket No. 50-353

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License No. NPF-85  
2. Safety Evaluation

cc w/encls: See next page

Mr. George A. Hunger, Jr.  
PECO Energy Company

Limerick Generating Station,  
Units 1 & 2

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

PHILADELPHIA ELECTRIC COMPANY  
DOCKET NO. 50-353  
LIMERICK GENERATING STATION, UNIT 2  
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 87  
License No. NPF-85

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Philadelphia Electric Company (the licensee) dated December 6, 1996, as supplement by letter dated January 15, and 28, 1997, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and 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 rules and 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;
  - 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.

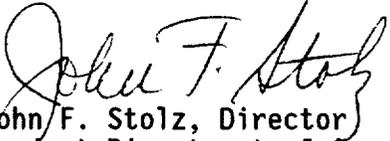
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-85 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 87, are hereby incorporated into this license. Philadelphia Electric Company 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

  
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: February 12, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 87

FACILITY OPERATING LICENSE NO. NPF-85

DOCKET NO. 50-353

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

Remove

2-1  
B 2-1

Insert

2-1  
B 2-1

## 2.0 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

### 2.1 SAFETY LIMITS

#### THERMAL POWER, Low Pressure or Low Flow

2.1.1 THERMAL POWER shall not exceed 25% of RATED THERMAL POWER with the reactor vessel steam dome pressure less than 785 psig or core flow less than 10% of rated flow.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

#### ACTION:

With THERMAL POWER exceeding 25% of RATED THERMAL POWER and the reactor vessel steam dome pressure less than 785 psig or core flow less than 10% of rated flow, be in at least HOT SHUTDOWN within 2 hours and comply with the requirements of Specification 6.7.1.

#### THERMAL POWER, High Pressure and High Flow

2.1.2 The MINIMUM CRITICAL POWER RATIO (MCPR) shall not be less than 1.11 for two recirculation loop operation and shall not be less than 1.12 for single recirculation loop operation with the reactor vessel steam dome pressure greater than 785 psig and core flow greater than 10% of rated flow.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

#### ACTION:

With MCPR less than 1.11 for two recirculation loop operation or less than 1.12 for single recirculation loop operation and the reactor vessel steam dome pressure greater than 785 psig and core flow greater than 10% of rated flow, be in at least HOT SHUTDOWN within 2 hours and comply with the requirements of Specification 6.7.1.

#### REACTOR COOLANT SYSTEM PRESSURE

2.1.3 The reactor coolant system pressure, as measured in the reactor vessel steam dome, shall not exceed 1325 psig.

APPLICABILITY: OPERATION CONDITIONS 1, 2, 3, and 4.

#### ACTION:

With the reactor coolant system pressure, as measured in the reactor vessel steam dome, above 1325 psig, be in at least HOT SHUTDOWN with reactor coolant system pressure less than or equal to 1325 psig within 2 hours and comply with the requirements of Specification 6.7.1.

## 2.1 SAFETY LIMITS

### BASES

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## 2.0 INTRODUCTION

The fuel cladding, reactor pressure vessel and primary system piping are the principle barriers to the release of radioactive materials to the environs. Safety Limits are established to protect the integrity of these barriers during normal plant operations and anticipated transients. The fuel cladding integrity Safety Limit is set such that no fuel damage is calculated to occur if the limit is not violated. Because fuel damage is not directly observable, a step-back approach is used to establish a Safety Limit such that the MCPR is not less than 1.11 for two recirculation loop operation and 1.12 for single recirculation loop operation. MCPR greater than 1.11 for two recirculation loop operation and 1.12 for single recirculation loop operation represents a conservative margin relative to the conditions required to maintain fuel cladding integrity. The fuel cladding is one of the physical barriers which separate the radioactive materials from the environs. The integrity of this cladding barrier is related to its relative freedom from perforations or cracking. Although some corrosion or use related cracking may occur during the life of the cladding, fission product migration from this source is incrementally cumulative and continuously measurable. Fuel cladding perforations, however, can result from thermal stresses which occur from reactor operation significantly above design conditions and the Limiting Safety System Settings. While fission product migration from cladding perforation is just as measurable as that from use related cracking, the thermally caused cladding perforations signal a threshold beyond which still greater thermal stresses may cause gross rather than incremental cladding deterioration. Therefore, the fuel cladding Safety Limit is defined with a margin to the conditions which would produce onset of transition boiling, MCPR of 1.0. These conditions represent a significant departure from the condition intended by design for planned operation. The MCPR values for both dual-loop and single loop operation, listed above, are valid only for Cycle 5 operation.

### 2.1.1 THERMAL POWER, Low Pressure or Low Flow

The use of the (GEXL) correlation is not valid for all critical power calculations at pressures below 785 psig or core flows less than 10% of rated flow. Therefore, the fuel cladding integrity Safety Limit is established by other means. This is done by establishing a limiting condition on core THERMAL POWER with the following basis. Since the pressure drop in the bypass region is essentially all elevation head, the core pressure drop at low power and flows will always be greater than 4.5 psi. Analyses show that with a bundle flow of  $28 \times 10^3$  lb/hr, bundle pressure drop is nearly independent of bundle power and has a value of 3.5 psi. Thus, the bundle flow with a 4.5 psi driving head will be greater than  $28 \times 10^3$  lb/hr. Full scale ATLAS test data taken at pressures from 14.7 psia to 800 psia indicate that the fuel assembly critical power at this flow is approximately 3.35 Mwt. With the design peaking factors, this corresponds to a THERMAL POWER of more than 50% of RATED THERMAL POWER. Thus, a THERMAL POWER limit of 25% of RATED THERMAL POWER for reactor pressure below 785 psig is conservative.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED AMENDMENT NO. 87 TO FACILITY OPERATING LICENSE NO. NPF-85  
PHILADELPHIA ELECTRIC COMPANY  
LIMERICK GENERATING STATION, UNIT 2  
DOCKET NO. 50-353

1.0 INTRODUCTION

By letter dated December 6, 1996, as supplemented January 15, and 28, 1997, the Philadelphia Electric Company (the licensee) submitted a request for changes to the Limerick Generating Station (LGS), Unit 2, Technical Specifications (TSs). The requested changes would revise TS Section 2.1 and its associated Bases to reflect the change in the Minimum Critical Power Ratio (MCPR) safety limits due to the plant specific evaluation performed by General Electric Company (GE) for LGS, Unit 2, Cycle 5 (LGS2C5). The January 15, and 28, 1997, letters provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

2.0 EVALUATION

The licensee requested a change to the LGS2C5 TSs in accordance with the 10 CFR 50.90. The proposed revision to TS Section 2.1 and its associated TS Bases is described below.

The MCPR safety limits in TS 2.1 and its associated Bases are proposed to be changed from 1.07 to 1.11 for operation with two recirculation loops, and from 1.08 to 1.12 for single loop operation (SLO). These changes are based on the cycle-specific analysis performed by GE for LGS2C5 mixed core of GE13/GE11/GE6 fuel. The cycle-specific parameters used included the actual core loading, the most limiting permissible control blade patterns, the actual bundle parameters, and the full cycle exposure range.

By letter dated August 4, 1996, supplemented by letter dated December 4, 1996, the licensee requested a change to the LGS, Unit 2, Cycle 4 (LGS2C4) MCPR safety limits from 1.07 to 1.10 for operation with two recirculation loops, and from 1.08 to 1.12 for SLO. The staff approved this licensee's request in a letter dated January 29, 1997. This earlier staff approval has been considered in this evaluation.

The staff has reviewed the proposed changes to the TS Section 2.1 and its associated Bases. The staff finds that these changes are based on the analyses using LGS2C5 cycle-specific inputs and approved methodologies

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including GESTAR II (NEDE-24011-P-A-11, Sections 1.1.5 and 1.2.5, November 1995), and NEDO-10985-A, January 1977, for both single and dual loop operation and finds them acceptable.

Because the R-factor methodology referenced in NEDE-24011-P-A-11 is not applicable to the part-length GE11 and GE13 fuel, a revised R-factor methodology described in NEDC-32505P, "R-Factor Calculation Method for GE11, GE12, and GE13 Fuel," November 1995, was used. The revised R-factor calculation method uses the same NRC-approved equation stated in GESTAR II (NEDE-24011-P-A-11) with the correction factors to account for the peaking-factor effects due to the part-length-rod design. The staff has reviewed the R-factor calculation method for the GE11 and GE13 and the relevant information provided in the proposed Amendment 25 to GESTAR II, NEDE-24011, December 13, 1996, (currently under staff review), and finds it acceptable for application to the GE11 and GE13 fuel in LGS2C5.

The staff requested the licensee to confirm that for the LGS2C5, Rod Withdrawal Error (RWE) analysis, the MCPR is the limiting parameter for setting the Rod Block Monitor (RBM) operability conditions. Additionally, the staff asked the licensee to confirm that the results for the cycle-specific RWE analysis performed for LGS2C5 demonstrated that the 1% cladding plastic strain criterion was met, and was not the limiting parameter. The licensee confirmed that the above statements are correct during the January 24, 1997, conference call, and documented this in its January 28, 1997, letter.

Based on this evaluation, the staff concludes that the proposed changes to TS 2.1 and its associated Bases are acceptable, because they have been analyzed based on the NRC-approved methods.

### 3.0 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.

### 4.0 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 previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (61 FR 67582). 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.

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

Principal Contributors: T. Huang  
F. Rinaldi

Date: February 12, 1997