

April 28, 2006

Mr. Christopher M. Crane
President and Chief Nuclear Officer
Exelon Nuclear
Exelon Generation Company, LLC
200 Exelon Way, KSA 3-E
Kennett Square, PA 19348

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 - ISSUANCE
OF AMENDMENT RE: LINEAR HEAT GENERATION RATE (TAC NOS.
MC9558 AND MC9559)

Dear Mr. Crane:

The Commission has issued the enclosed Amendments Nos. 258 and 261 to Renewed Facility Operating License Nos. DPR-44 and DPR-56 for Peach Bottom Atomic Power Station, Units 2 and 3, respectively. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated April 28, 2005. The proposed changes modify TSs 3.3.4.2, "End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation," 3.4.1, "Recirculation Loops Operating," and 3.7.6, "Main Turbine Bypass System," to add a requirement for the linear heat generation rate limits specified in the Core Operating Limits Report.

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 by Theresa M. Valentine for/

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

Docket Nos. 50-277 and 50-278

Enclosures:

1. Amendment No. 258 to Renewed DPR-44
2. Amendment No. 261 to Renewed DPR-56
3. Safety Evaluation

cc w/encls: See next page

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DATE	4/27/06	4/27/06	4/12/06	4/7/2006	4/19/06	4/27/06	4/28/06

Official Record Copy

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EXELON GENERATION COMPANY, LLC

PSEG NUCLEAR LLC

DOCKET NO. 50-277

PEACH BOTTOM ATOMIC POWER STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 258
Renewed License No. DPR-44

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (Exelon Generation Company), and PSEG Nuclear LLC (the licensees), dated April 28, 2005, 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 Renewed Facility Operating License No. DPR-44 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 258, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA by R. B. Ennis for/

Darrell J. Roberts, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: April 28, 2006

ATTACHMENT TO LICENSE AMENDMENT NO. 258

RENEWED FACILITY OPERATING LICENSE NO. DPR-44

DOCKET NO. 50-277

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

3.3-31a

3.4-1

3.7-12

Insert

3.3-31a

3.4-1

3.7-12

EXELON GENERATION COMPANY, LLC

PSEG NUCLEAR LLC

DOCKET NO. 50-278

PEACH BOTTOM ATOMIC POWER STATION, UNIT 3

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 261
Renewed License No. DPR-56

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (Exelon Generation Company), and PSEG Nuclear LLC (the licensees), dated April 28, 2005, 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 Renewed Facility Operating License No. DPR-56 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 261, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA by R. B. Ennis for/

Darrell J. Roberts, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: April 28, 2006

ATTACHMENT TO LICENSE AMENDMENT NO. 261

RENEWED FACILITY OPERATING LICENSE NO. DPR-56

DOCKET NO. 50-278

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

3.3-31a

3.4-1

3.7-12

Insert

3.3-31a

3.4-1

3.7-12

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 258 TO RENEWED FACILITY OPERATING
LICENSE NO. DPR-44 AND AMENDMENT NO. 261 TO RENEWED FACILITY OPERATING
LICENSE NO. DPR-56
EXELON GENERATION COMPANY, LLC
PSEG NUCLEAR LLC
PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
DOCKET NOS. 50-277 AND 50-278

1.0 INTRODUCTION

By application dated April 28, 2005, Exelon Generation Company, LLC (the licensee), requested changes to the Technical Specifications (TSs) for Peach Bottom Atomic Power Station, Units 2 and 3 (PBAPS 2 and 3). Specifically, the proposed changes would add a requirement in TS 3.3.4.2, "End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation," TS 3.4.1, "Recirculation Loops Operating," and TS 3.7.6, "Main Turbine Bypass System," to comply with the appropriate linear heat generation rate (LHGR) limits. The actual LHGR limits values for these operating states are specified in the core operating limit report (COLR) on cycle-specific bases.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36, "Technical Specifications," provides the regulatory requirements for the content required in a licensee's TSs. Criterion 2 of 10 CFR 50.36(c)(2)(ii) requires a limiting condition for operation to be established for 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.

The LHGR is a measure of the heat generation rate of a fuel rod in a fuel assembly at any axial location. Limits on the LHGR are specified to ensure that fuel design limits are not exceeded anywhere in the core during normal operation or anticipated operational occurrences (AOOs) and to ensure that the peak cladding temperature (PCT) during a postulated design-basis loss-of-coolant accident (LOCA) does not exceed the limits specified in 10 CFR 50.46. Average planar linear heat generation rate (APLHGR) limits are based on the results of emergency core

cooling system (ECCS) analyses and are developed to assure that the PCT does not exceed 2200 °F during limiting accidents.

The fuel system consists of arrays of fuel rods including fuel pellets and tubular cladding, spacer grids, end plates, and reactivity control rods. The objectives of the fuel system safety review are to provide assurance that: (1) the fuel system is not damaged as a result of normal operation and AOOs; (2) fuel system damage is never so severe as to prevent control rod insertion when it is required; (3) the number of fuel rod failures is not underestimated for postulated accidents; and (4) coolability is always maintained. The Nuclear Regulatory Commission (NRC or the Commission) staff acceptance criteria are based on the NUREG-0800, "Standard Review Plan" (SRP), Section 4.2, "Fuel System Design."

3.0 TECHNICAL EVALUATION

3.1 LHGR Limits

The LHGR is defined as the power generated in a fixed length of fuel rod (or node). The process computer routinely monitors LHGR on a six-inch-segment basis for each fuel rod in units of kilowatts per foot (kW/ft). It is a thermal-mechanical (T-M) limit that assures the integrity of the fuel cladding during steady state, transient and accident conditions. During heatup, a limit is placed on the nodal kW/ft to assure that the diametric strain caused by differential pellet/cladding creep and swelling would not result in 1% plastic strain. During transients and accidents, the fuel pellet experiences overpower, which could result in fuel centerline melt. Therefore, a limit is also placed on the nodal kW/ft to prevent fuel centerline melting during transient and accident conditions. The peak kW/ft is exposure dependent and the limiting of the T-M limit establishes the steady state kW/ft. Exceeding the LHGR limit could potentially result in fuel damage and subsequent release of radioactive materials.

Limiting condition for operation (LCO) 3.2.3 specifies the requirements to comply with the fuel-dependent LHGR for power greater than 25%. The actual values of the LHGR limit for LCO 3.2.3 are also specified in the cycle-specific COLR. TS 5.6.5, "Core Operating Limits Report (COLR)," requires core operating limits to be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and documented in the COLR to ensure that all applicable limits of the safety analysis are met. Currently, TS 3.3.4.2, TS 3.4.1, and TS 3.7.6 require that the limits for the APLHGR and the minimum critical power ratio (MCPR) be adjusted for an inoperable End of Cycle Recirculation Pump Trip (EOC-RPT) instrument function, single recirculation loop operation, or an inoperable Main Turbine Bypass System. The adjusted APLHGR and MCPR for these operating states are also specified in the COLR. However, there are currently no TS requirements to adjust the LHGR limits for operation with an inoperable EOC-RPT instrument function, single recirculation loop (SLO) operation, or for an inoperable Main Turbine Bypass System. The licensee administratively controls the operating kW/ft against the LHGR limits at the adjusted values for operation with SLO, inoperable EOC-RPT, or inoperable Main Turbine Bypass System.

3.2 Core Simulation

The licensee has implemented an updated version of PANACEA, which is a three-dimensional core simulator code that performs coupled neutronic and thermal-hydraulic calculations. PANACEA performs detailed three-dimensional core design and operational calculations of neutron flux, power distributions and thermal performance as a function of control rod position, refueling pattern, coolant flow, reactor pressure and other operational and design variables. The need for the proposed TS changes stem from the differences in the method employed by the two versions of the code (i.e., PANAC10 and PANAC11) in the treatment of the APLHGR and the LHGR.

An LHGR multiplier is not required when monitoring or designing with PANAC10, because composite ECCS-LOCA T-M APLHGR limits are used. The composite APLHGR limits are a combination of the APLHGR limits based on ECCS requirements and equivalent APLHGR limits based on LHGR fuel T-M design requirements. When using PANAC10, the APLHGR multiplier is sufficient to ensure that the PCT is bounded and that the fuel T-M design limits are not exceeded during AOOs.

When designing or monitoring with PANAC11, LHGR is treated independently from APLHGR. The PANAC11 method does include the use of an APLHGR multiplier. However, the APLHGR limit used with PANAC11 is based only on the ECCS-LOCA PCT limit. The fuel T-M limits are addressed separately using an exposure-dependent LHGR limit. Since the ECCS and T-M limits are analyzed and monitored separately, an LHGR multiplier is also required to ensure that fuel T-M design limits are not exceeded. Therefore, the amendment request proposes TS controls of the COLR-specified LHGR for operation with SLO, inoperable EOC-RPT, or inoperable Main Turbine Bypass System.

The NRC staff approved the use of PANAC10 in Amendment 19 to General Electric licensing topical report NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR II)." Subsequently, the staff approved the use of PANAC11 in Amendment 26 to GESTAR II.

3.3 LHGR for EOC-RPT, SLO and Main Turbine Bypass System

The licensee may elect to operate with inoperable EOC-RPT, SLO, or inoperable Main Turbine Bypass System to add operating flexibility. However, these conditions with equipment out of service (OOS) are initial conditions that need to be evaluated as design bases events. Transient or accident events initiated at off-rated conditions or with equipment OOS may result in a more limiting response. Thus, the thermal limits may be adjusted lower so that the fuel is operated without exceeding the fuel design acceptance criteria.

Similarly, LHGR multipliers may be required for operation at off-rated or other operating conditions (i.e., inoperable EOC-RPT instrument function, SLO, or inoperable Main Turbine Bypass System) in order to ensure that fuel design limits are not exceeded anywhere in the core during normal operation and AOOs. These multipliers are calculated in accordance with the methodologies described in GESTAR II. The GESTAR II methodology requires that the LHGR design limits are met for all operating conditions, including operation with SLO and

equipment OOS. In the standard reload analyses, transient analyses are performed with the applicable operating flexibilities and thermal limits established, including the LHGR multipliers.

In addition, the LOCA-based LHGR limits such as the SLO LHGR multiplier are also calculated in accordance with SAFER/GESTR methodology (NEDE-23785-1-PA, October 1984). When LOCA analyses are performed, the SAFER/GESTR methodology requires a 10 CFR Part 50, Appendix K, licensing basis PCT of less than 2200 °F and an upper bound PCT (UBPCT) less than the licensing basis PCT.

The conservatism in the UBPCT calculation relative to 10 CFR Part 50, Appendix K, assumptions is assured by determining LHGR and APLHGR multipliers that maintain the SLO PCT below the two-loop PCT. The assumed LHGR kW/ft is important in determining the PCT in the LOCA analyses. For low-core flow conditions, as is the case for SLO, operation with the rated LHGR value could drive the PCT above the two-loop PCT. In order to prevent the SLO operating condition from becoming the limiting operating statepoint, the LHGR and APLHGR are reduced. The lower LHGR and APLHGR limits assumed in the ECCS-LOCA analyses at the SLO conditions ensure that the SLO ECCS-LOCA response is not more limiting than the rated power/flow statepoint ECCS-LOCA, with the two recirculation loops in operation. The ECCS analyses also establish an APLHGR multiplier in order to limit the PCT increase for SLO operation. When the multipliers are developed, both the LHGR and APLHGR values are reduced in the ECCS analyses until the PCT passes the acceptance criterion. Therefore, PBAPS must be operated within the lower SLO LHGR limit in order to adhere with the ECCS-LOCA analysis-of-record.

3.4 Proposed TS Changes

The proposed changes would modify TS 3.3.4.2, TS 3.4.1, and TS 3.7.6, to add requirements for LHGR limits. The actual values would be specified in the cycle-specific COLR. Specifically, the proposed change revises:

1. TS 3.3.4.2, "End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation," by adding:
 - b.3. LCO 3.2.3, "LINEAR HEAT GENERATION RATE (LHGR)," limits for an inoperable EOC-RPT as specified in the COLR.
2. TS 3.4.1, "Recirculation Loops Operating," by adding:
 - c. LCO 3.2.3, "LINEAR HEAT GENERATION RATE (LHGR)," single loop operation limits specified in the COLR.

The proposed change also re-designates the existing LCO 3.4.1.c as LCO 3.4.1.d.

3. TS 3.7.6, "Main Turbine Bypass System," by adding:
 - c. LCO 3.2.3, "LINEAR HEAT GENERATION RATE (LHGR)," limits for an inoperable Main Turbine Bypass System, as specified in the COLR.

After reviewing the licensee's application, the NRC staff has determined that the limits the licensee has requested to place in the LCOs of TSs 3.3.4.2, 3.4.1, and 3.7.6 are COLR limits that the licensee is already required to meet. Therefore, these limits do not constitute new operational limits. The staff has further concluded that these limits constitute 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 and, therefore, are appropriate for inclusion in the TSs in accordance with 10 CFR 50.36. The specific LHGR limits would be developed using NRC-approved methods and calculated on cycle-specific bases such that the fuel is protected for operation with an inoperable EOC-RPT instrument function, SLO, or inoperable Main Turbine Bypass System. The staff, therefore, finds the proposed amendments to be acceptable.

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 (71 FR 7807). Accordingly, the amendments meet 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 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 Contributors: Z. Abdullahi
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Date: April 28, 2006