

March 31, 2006

Mr. Christopher M. Crane, President  
and Chief Nuclear Officer  
Exelon Generation Company, LLC  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNIT 2 - ISSUANCE OF  
AMENDMENT RE: MINIMUM CRITICAL POWER RATIO SAFETY LIMIT (TAC  
NO. MC9243)

Dear Mr. Crane:

The Commission has issued the enclosed Amendment No. 226 to Renewed Facility Operating License No. DPR-30 for the Quad Cities Nuclear Power Station, Unit 2. The amendment is in response to your application dated December 15, 2005, supplemented by your letters dated February 13 and March 3, 2006. The amendment revises Technical Specification (TS) Section 2.1.1, "Reactor Core SLs."

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

***/RA/***

Maitri Banerjee, Senior Project Manager  
Plant Licensing Branch III-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-265

Enclosures:

1. Amendment No. 226 to DPR-30
2. Safety Evaluation

cc w/encls: See next page

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EXELON GENERATION COMPANY, LLC

AND

MIDAMERICAN ENERGY COMPANY

DOCKET NO. 50-265

QUAD CITIES NUCLEAR POWER STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 226  
License No. DPR-30

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Exelon Generation Company, LLC, et al. (the licensee) dated December 15, 2005, as supplemented by letters dated February 13 and March 3, 2006, 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 3.B. of Renewed Facility Operating License No. DPR-30 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 226, are hereby incorporated into the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to unit startup with a reactor core containing Westinghouse Optima2 fuel.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Daniel S. Collins, Chief  
Plant Licensing Branch III-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: March 31, 2006

ATTACHMENT TO LICENSE AMENDMENT NO. 226

RENEWED FACILITY OPERATING LICENSE NO. DPR-30

DOCKET NO. 50-265

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

REMOVE

2.0-1

INSERT

2.0-1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO  
AMENDMENT NO. 226 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-30  
EXELON GENERATION COMPANY, LLC  
AND  
MIDAMERICAN ENERGY COMPANY  
QUAD CITIES NUCLEAR POWER STATION, UNIT 2  
DOCKET NO. 50-265

1.0 INTRODUCTION

By letter to the Nuclear Regulatory Commission (NRC, Commission) dated December 15, 2005 (Reference 1), as supplemented by letters dated February 13, 2006 (Reference 2) and March 3, 2006 (Reference 3), Exelon Generation Company, LLC, et al. (the licensee) requested changes to the technical specifications (TSs) for Quad Cities Nuclear Power Station (QCNPS), Unit 2. The February 13 and March 3, 2006, supplements contained clarifying information and did not change the NRC staff's initial proposed finding of no significant hazards consideration.

The proposed changes would revise the safety limit minimum critical power ratio (SLMCPR) values in TS 2.1.1.2 and the approved methodologies used in the minimum critical power ratio (MCPR) safety limit analysis in its associated TS Bases for QCNPS, Unit 2, Cycle 19. The QCNPS, Unit 2, Cycle 19 core has 724 fuel assemblies, of which 228 are fresh Westinghouse SVEA-96 Optima 2 assemblies, 240 are once-burned General Electric (GE) 14 assemblies, and 256 are twice-burned GE14 assemblies.

2.0 REGULATORY EVALUATION

The licensee identified the applicable regulatory requirements in Section 5.0 of Attachment 1 to Reference 1. The licensee requested the proposed changes to the QCNPS, Unit 2, TS in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.92, "Issuance of amendment." The regulatory requirements that the NRC staff considered in its review of the application are in 10 CFR 50.36, "Technical Specifications," which provides the regulatory requirements for the content required in a licensee's TS. In addition, Appendix A to 10 CFR Part 50, General Design Criterion (GDC) 10, "Reactor Design," requires that the reactor core and associated coolant, control, and protective system be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during steady state operation, normal operational transients, and anticipated operational occurrences. To ensure

compliance with GDC 10 of Appendix A, 10 CFR Part 50, the NRC staff confirms that the licensee performed the plant-specific SLMCPR analyses using NRC-approved methodologies as prescribed in NUREG-0800, Standard Review Plan Section 4.4. The SLMCPR ensures that sufficient conservatism exists in the operating MCPR limit such that, in the event of an anticipated operational occurrence, at least 99.9 percent of the fuel rods in the core will avoid boiling transition for the power distribution within the core including all uncertainties.

### 3.0 TECHNICAL EVALUATION

The license amendment request includes changes to the QCNPS, Unit 2 TSs to support the transition to Westinghouse SVEA-96 Optima2 fuel beginning with QCNPS, Unit 2, Cycle 19. These changes are discussed in Attachment 1 of Reference 1 and addressed below. The proposed revision of the TSs is described below.

#### 3.1 TS 2.1.1 Reactor Core Safety Limits (SLs)

The licensee proposed to change the SLMCPR values in TS 2.1.1.2 for the QCNPS, Unit 2 for Cycle 19 operation from one set to two sets of SLMCPR values to cover the mixed core design as follows for when the reactor steam dome pressure is \$ 785 psig and the core flow is \$ 10 percent rated core flow:

For QCNPS, Unit 2, MCPR for Global Nuclear Fuel (GNF) fuel shall be \$ 1.09 for two recirculation loop operation, or \$ 1.10 for single recirculation loop operation.

MCPR for the Westinghouse SVEA-96 Optima2 fuel shall be \$1.11 for two recirculation loop operation, or \$ 1.13 for single recirculation loop operation.

The licensee described the approved methodologies used to calculate the SLMCPR value for the proposed TS change in the Reference 1 submittal. The QCNPS, Unit 2, Cycle 19 SLMCPR analysis was performed by Westinghouse and the licensee using the following QCNPS, Unit 2 plant- and cycle-specific fuel and core parameters (identified in References 1 and 2), applicable correlations and NRC-approved methodologies:

1. PHOENIX lattice physics code and POLCA7 three-dimensional simulator code was used by Westinghouse;
2. CASMO4 lattice physics code and MICROBUN-B2 three-dimensional simulator code to perform bundle and core design calculation was used by the licensee;
3. WCAP-16081-P-A, "10x10 SVEA Fuel Critical Power Experiments and CPR Correlation: SVEA-96 Optima2;"
4. CENPD-300-P-A, "Reference Safety Report for Boiling Water Reactor Reload Fuel;"
5. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR)."

In addition, the licensee also used the USAG14 correlation documented in the following report:

NF-BEX-05-10, Revision 1, "Task Report for TSD DQW04-020, CPR Correlation for Design dated October 21, 2005" to support CPR evaluation for the GE14 co-resident fuel.

The licensee in References 1 and 2 describes the process used to calculate the SLMCPR values for the GE14 fuel, the Westinghouse SVEA-96 Optima2 fuel, and POWERPLEX-III core monitoring system, which has flexible inputs and monitoring capabilities such that the operating limit minimum critical power ratio (OLMCPR) sets can be input and applied to each fuel type. The core monitoring system calculates the MCPR of every fuel assembly, and the limiting results are displayed in the control room using the appropriate OLMCPR for each fuel type. Action to reduce the limiting MCPR is taken if the core approaches the limits. For QCNPS, Unit 2, Cycle 19, the differences in the GE14 and Westinghouse SVEA-96 Optima2 SLMCPR values will be accounted for by the core monitoring system when it determines the limiting MCPR values based on the appropriate GE14 or Westinghouse SVEA-96 Optima2 OLMCPR set. The licensee states in Reference 2 that the GE 14 fuel will be monitored with the Global Nuclear Fuel GEXL14 correlation, while Westinghouse will use the USAG14 correlation for GE14 fuel to determine the appropriate GE14 OLMCPR in the cycle-specific reload licensing analysis. The licensee also provides further justification that the differential of approximately 0.02 in single recirculation loop and dual recirculation loop SLMCPRs is primarily a consequence of the increase in core flow uncertainty identified in Reference 1.

The NRC staff has reviewed the justification contained in Reference 1, and the corresponding Reference 2 and 3 supplements, for the proposed SLMCPR values for the Westinghouse SVEA 96 Optima2 fuel, which are 1.13 for single-loop recirculation loop operation and 1.11 for two recirculation loop operation, and found them acceptable since NRC-approved methodologies were used. The NRC staff conducted an audit at Westinghouse of the methodologies and correlations used, and confirmed that Westinghouse applied its approved method in accordance with the approved topical reports.

Based on the information contained in the application (Reference 1), and the supplements to the application (References 2 and 3), the NRC staff has concluded that the licensee has adequately addressed the issues with respect to a 0.02 increase of SLMCPR value during the QCNPS, Unit 2, Cycle 19 single loop operation due to an increase of the core flow uncertainty from two loop to single loop operation. The NRC staff has also reviewed the justification for the SLMCPR calculation with respect to a recent error discovered with the GE-14 correlation concerning the critical power determination and found it acceptable because a multiplicative factor C of  $< 1$  is applied to this SLMCPR calculation.

Therefore, the proposed SLMCPR values and their analysis for QCNPS, Unit 2, Cycle 19 operation using the plant- and cycle-specific calculation in conjunction with the approved methodologies are acceptable. The QCNPS, Unit 2, Cycle 19 SLMCPR will ensure that 99.9 percent of the fuel rods in the core will not experience a boiling transition, which satisfies the requirements of GDC 10 of Appendix A to 10 CFR Part 50 regarding an acceptable fuel design limit.



### 3.2 Page B 2.1.1-6

The licensee proposed to add two Westinghouse-approved methodologies (Item 8 - WCAP-16081-P-A and Item 9 - CENPD-300-P-A) in the "References" section of the TS Bases.

The NRC staff has reviewed the proposed changes to the "References" section on page B 2.1.1-6 and found them acceptable because they are NRC-approved methodologies that support the SLMCPR calculation. However, the licensee should conduct a timely review of the methodologies listed in the "References" section of the TS Bases to comply with the guidance specified in Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications." For example, Items 2, 3, 5, and 6 are Framatome methodologies, yet there will be no Framatome fuel in the QCNPS, Unit 2, Cycle 19 core. Therefore, Items 2, 3, 5, and 6 should be removed from the "References" section of the TS Bases.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois 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 requirements with respect to the installation or use of a facility's components 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 on (71 FR 2951; January 17, 2006). 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.

### 7.0 REFERENCES

1. Letter from Patrick R. Simpson to U.S. Nuclear Regulatory Commission, "Request for Technical Specifications Change for Minimum Critical Power Ratio Safety Limit," Quad Cities Nuclear Power Station, Unit 2 Renewed Facility Operating License No. DPR-30, December 15, 2005, Agencywide Documents Access and Management System (ADAMS) Accession Number ML060730371.

2. Letter from Patrick R. Simpson to U.S. Nuclear Regulatory Commission, "Additional Information Supporting Request for Technical Specifications Change for Minimum Critical Power Ratio Safety Limit," Quad Cities Nuclear Power Station, Unit 2 Renewed Facility Operating License No. DPR-30, February 13, 2006, ADAMS Accession No. ML060730491.
3. Letter from Keith R. Jury to U.S. Nuclear Regulatory Commission, "Additional Information Supporting Request for License Amendment Request Regarding Transition to Westinghouse Fuel and Request for Technical Specifications Change for Minimum Critical Power Ratio Safety Limit," March 3, 2006, ADAMS Accession No. ML060660556.

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Date: March 31, 2006

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