

May 9, 2002

Mr. John L. Skolds, President  
and Chief Nuclear Officer  
Exelon Nuclear  
Exelon Generation Company, LLC  
200 Exelon Way, KSA 3-E  
Kennett Square, PA 19348

SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 - ISSUANCE OF  
AMENDMENT RE: DRYWELL AVERAGE AIR TEMPERATURE INCREASE  
(TAC NOS. MB2192 AND 2193)

Dear Mr. Skolds:

The Commission has issued the enclosed Amendment No. 159 to Facility Operating License No. NPF-39 and Amendment No. 121 to Facility Operating License No. NPF-85 for the Limerick Generating Station, Units 1 and 2. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated June 1, 2001, as supplemented February 8, 2002.

These amendments revise Limiting Condition for Operation 3.6.1.7 concerning drywell average air temperature.

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/*

Christopher Gratton, Sr. Project Manager, Section 2  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-352 and 50-353

Enclosures: 1. Amendment No. 159 to  
License No. NPF-39  
2. Amendment No. 121 to  
License No. NPF-85  
3. Safety Evaluation

cc w/encls: See next page

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DISTRIBUTION:

MO'Brien	PUBLIC	CGratton	CHolden
JLehning	PDI-2 R/F	OGC	ACRS
SRichards	GHill (4)	JClifford	BPlatchek, RGN-I
PShemanski	RLobel	RDennig	

**Package: ML021340231**

**TSs: ML021330196**

**Accession Number: ML021020539** \*See Previous Concurrence \*\*No major changes made

OFFICE	PDI-2/PM	PDI-2/LA	OGC	PDI-2/SC	SPLB/SC(a)	EMEB/BC	EEIB/SC
NAME	CGratton	MO'Brien	SUttal	JClifford	RLobel*	Elmbro	CHolden**
DATE	4-19-02	4/30/02	4-26-02	5/7/02	4/15/02	4/29/02	SE dtd 3/7/02

Limerick Generating Station, Units 1 & 2

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EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-352

LIMERICK GENERATING STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 159  
License No. NPF-39

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Exelon Generation Company, LLC (the licensee), dated June 1, 2001, as supplemented February 8, 2002, 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-39 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. 159, are hereby incorporated into this license. Exelon Generation 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

*/RA/*

James W. Clifford, Chief, Section 2  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the  
Technical Specifications

Date of Issuance: May 9, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 159

FACILITY OPERATING LICENSE NO. NPF-39

DOCKET NO. 50-352

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

Remove  
3/4 6-10

Insert  
3/4 6-10

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-353

LIMERICK GENERATING STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 121  
License No. NPF-85

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Exelon Generation Company, LLC (the licensee), dated June 1, 2001, as supplemented February 8, 2002, 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. 121, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. The license amendment is effective as of its date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

James W. Clifford, Chief, Section 2  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the  
Technical Specifications

Date of Issuance: May 9, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 121

FACILITY OPERATING LICENSE NO. NPF-85

DOCKET NO. 50-353

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

Remove  
3/4 6-10

Insert  
3/4 6-10

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 159 AND 121 TO FACILITY OPERATING

LICENSE NOS. NPF-39 AND NPF-85

EXELON GENERATION COMPANY, LLC

LIMERICK GENERATING STATION, UNITS 1 AND 2

DOCKET NOS. 50-352 AND 50-353

1.0 INTRODUCTION

By letter dated June 1, 2002, as supplemented February 8, 2002, the Exelon Generation Company, LLC (the licensee), submitted a request for changes to the Limerick Generating Station (LGS), Units 1 and 2, Technical Specifications (TSs). The requested changes would revise the Limiting Condition for Operation 3.6.1.7 concerning drywell average air temperature. The licensee's proposal would increase the TS limit for drywell average air temperature from 135 degrees Fahrenheit (°F) to 145 °F. The licensee stated that the proposed change would allow the potential unavailability of components in the non-safety-related drywell chilled water system to be accommodated without impacting power generation.

After reviewing the licensee's submittal dated June 1, 2001, the NRC staff concluded that additional information was required to determine the acceptability of the proposed TS change. On January 30, 2002, a conference call was convened with the licensee to discuss the proposed change with regard to the instrument uncertainty associated with the drywell temperature measurement and the appropriateness of the current method for calculating drywell average air temperature. To address the staff's concerns, the licensee supplemented their amendment request in a letter dated February 8, 2002. The February 8, 2002, letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination or expand the scope of the original *Federal Register* notice.

2.0 BACKGROUND

The drywell average air temperature is a volumetric average of the measured temperatures in the drywell. Temperature sensors are installed at four approximate elevations and various azimuths, and the LGS Units 1 and 2 TSs require that at least one temperature reading from each elevation be taken as an input to the volumetric average calculation. The LGS Units 1 and 2 TSs require that the drywell average air temperature be determined every 24 hours.

In its submittal, the licensee stated that the actual heat loads experienced in the drywell have proven to be higher than predicted in the design calculations. As a result, normal power operation has been challenging the TS limit for drywell average air temperature, especially in the hotter ambient temperature conditions occurring during the summer. The licensee stated that the current 135 °F TS limit for drywell average air temperature has provided a minimal

operating margin, even when both drywell chilled water circulation pumps are placed into service. Under such circumstances, the unavailability of a single drywell chilled water circulation pump could result in exceeding the TS limit for drywell average air temperature if full-power operation were maintained.

If the TS limit for drywell average air temperature were exceeded, Limiting Condition for Operation (LCO) 3.6.1.7 would be entered, requiring either a temperature reduction below the TS limit within 8 hours or a controlled plant shutdown. Changing LCO 3.6.1.7 to increase the TS limit for drywell average air temperature to 145 °F could thus prevent a TS-required power decrease or controlled shutdown due to an unavailability in the nonsafety-related drywell chilled water system.

### 3.0 EVALUATION

The principal safety concerns related to increasing the TS limit for drywell average air temperature are as follows: (1) the potential for increased peak containment analysis parameters (e.g., temperature and pressure) during a design-basis accident, (2) the potential to exceed the temperature qualification for mechanical and electrical safety-related structures, systems, and components (SSCs) in the drywell.

#### 3.1 Analysis of Peak Containment Parameters

The TS limit for drywell average air temperature ensures that the drywell design temperature would not be exceeded by the peak drywell temperature during a postulated design-basis accident (DBA). The drywell design temperature of 340 °F was selected to ensure containment integrity and to ensure that all SSCs required to mitigate the consequences of a DBA would be capable of performing their design functions in all postulated drywell temperatures. Generally, peak values for containment analysis parameters (e.g., temperature and pressure) have a strong dependence upon the initial conditions of the primary system (e.g., enthalpy) and the size of the breach in the primary system pressure boundary. In contrast, a relatively small change in the initial drywell temperature would be expected to have a minor effect on the peak containment analysis parameters. Nevertheless, the TS limit for drywell average air temperature is significant in that it provides assurance that the peak containment analysis parameters will not be exceeded by requiring that the plant be operated under analyzed conditions.

Table 6.2-4A of the LGS Units 1 and 2 Updated Final Safety Analysis Report (UFSAR) states that the current containment analysis for LGS Units 1 and 2, is based upon an initial drywell air temperature of 150 °F. This containment analysis demonstrates that, given an initial drywell air temperature of 150 °F, neither the drywell design temperature of 340 °F nor the drywell design pressure of 55 psig would be exceeded during a DBA. Thus, the proposed TS limit of 145 °F would not require alteration to the current containment analysis and would provide a 5 °F margin to the initial temperature used to assure containment integrity for a DBA.

The licensee's containment analysis was performed using General Electric (GE) codes and models. The M3CPT code was used to determine the short-term containment response, and the SHEX code was used to determine the long-term containment response. The LGS Units 1 and 2 UFSAR states that this containment analysis follows Regulatory Guide 1.49, entitled "Power Levels of Nuclear Power Plants," and is in accordance with standard methodology and

vendor guidance. The GE codes and models used by the licensee have been approved by the NRC staff for plant-specific licensing actions, including the power-uprate amendments for LGS Units 1 and 2, which were approved by the NRC on January 24, 1996, and February 16, 1995, respectively.

Based upon the foregoing evaluation, the NRC staff has concluded that the proposed TS limit of 145 °F for drywell average air temperature would not result in peak containment parameters exceeding their design values during a design-basis accident.

### 3.2 Temperature Qualification of Mechanical and Structural Drywell SSCs

The TS limit for drywell average air temperature also ensures that the temperature qualification for all safety-related SSCs in the drywell is not exceeded. The licensee evaluated the SSCs in the drywell and determined that an average annual drywell air temperature of 145 °F would not adversely affect their capabilities to function as designed. The proposed change would not degrade any primary coolant system or primary containment boundary, nor would it prevent these boundaries from performing their design functions during a DBA. The licensee further stated in their June 1, 2001, application, that, even if the drywell average air temperature were to inadvertently exceed the proposed TS limit of 145 °F, all SSCs would remain within their allowable temperature limits up to approximately 150 °F. However, if it were determined that an average annual drywell air temperature of 145 °F had been exceeded, the licensee stated in their application that a programmatic review of equipment replacement frequency would be undertaken.

The licensee stated in its supplementary submittal dated February 8, 2002, that instrument uncertainty has a minimal impact upon the drywell annual average air temperature calculation, and that a conservative instrument uncertainty factor is considered during the review of annual temperature effects on the lives of qualified equipment. However, if the replacement frequency of any component should be affected, there is adequate time to adjust its replacement frequency without any adverse effect to the licensing basis of the plant. On this basis, the staff has assurance that the licensee has properly accounted for the effect of instrument uncertainty with its equipment qualification program.

The licensee's supplementary submittal additionally states that the proposed change does not affect the acceptability of the current method of calculating drywell average air temperature for equipment qualification purposes. The increase to the TS limit for drywell average air temperature does not eliminate any margin with respect to how the drywell average annual air temperature is currently evaluated. Therefore, the staff has concluded that the licensee's current method of calculating drywell average air temperature will remain valid for the purpose of equipment qualification.

Table 3.8-3 of the LGS Units 1 and 2 UFSAR specifies that the design temperature criteria for Seismic Category I structures assumes that the drywell air temperature at the beginning of a DBA is 135 °F. However, the licensee has performed an engineering evaluation which has determined that increasing the initial drywell air temperature to 150 °F would not adversely affect the ability of any Seismic Category I structure from performing its design function. The NRC staff finds the revised drywell air temperature of 150 °F to be within the allowable limit of 150 °F specified by the American Concrete Institute (ACI) 318-71. Therefore, the effect of the potential temperature increase upon Seismic Category I structures is negligible and acceptable.

Based upon the foregoing evaluation, the NRC staff has concluded that the proposed TS limit of 145 °F for drywell average air temperature would be consistent with the temperature qualification of structures and mechanical systems and components in the drywell.

### 3.3 Temperature Qualification of Safety-Related Electrical Components in the Drywell

The environmental qualification design of electrical equipment installed at LGS Units 1 and 2, is discussed in UFSAR Section 3.11. Under all conditions postulated to occur during its installed life, all safety-related electrical equipment must be capable of performing its safety function and remaining in a safe mode. The licensee stated in their June 1, 2001, application, that for electrical equipment in the drywell, the qualified life for this equipment was based on operation at an average annual temperature of 145 °F with maximum temperatures of 150 °F. The licensee also stated in their application that if the average annual temperature of 145 °F were to be exceeded, the environmental qualification programmatic review process would assess the impact on qualified life and the replacement frequency for qualified electrical equipment. The licensee periodically evaluates the effects of ambient temperature on drywell equipment to validate the qualified life calculations based on actual measured temperature history. In addition, the licensee stated in their application that they will continue to evaluate whether to refurbish or replace equipment due to aging effects as part of the Preventive Maintenance/Surveillance Program.

As stated in UFSAR Section 8.3.1.1.7, the drywell power and control cables are designed so that when carrying the maximum allowable current capacity of the cable in a surrounding air temperature of 65 degrees Celsius (°C) (149 °F), the cable insulation temperature will not exceed 90 °C. Therefore, it can be concluded that increasing the operating limit for the drywell average temperature to 145 °F will not have an adverse effect on the cables in the drywell.

Based on the above, the NRC staff believes that the electrical equipment in the drywell will remain within the limitations of the Equipment Qualification program, which is qualified and maintained based on operation at an average annual temperature of 145 °F. The staff concludes that the proposed TS drywell average air temperature action limit of 145 °F will not have an adverse effect on the qualified life calculations for drywell electrical equipment that is qualified in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.49.

For the reasons stated in Section 3.1, 3.2, and 3.3, of this safety evaluation, the NRC staff has found the licensee's proposed TS change 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 (66 FR 41619). 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: J. Lehning  
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Date: May 9, 2002