

July 7, 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: LIMERICK GENERATING STATION, UNIT 2 - ISSUANCE OF AMENDMENT
RE: ONE-TIME CHANGE TO THE DRYWELL AVERAGE AIR TEMPERATURE
LIMIT (TAC NO. MD2315)

Dear Mr. Crane:

The Commission has issued the enclosed Amendment No. 145 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 June 9, 2006, as supplemented by your letters dated June 16 and June 23, 2006.

This amendment would revise TS Limiting Condition for Operation 3.6.1.7 by adding a footnote to the TS limit for drywell average air temperature of 145 degrees Fahrenheit (°F) to allow continued operation of LGS, Unit 2, with drywell average air temperature no greater than 148 °F for the remainder of the current operating cycle (Cycle 9), which is currently scheduled to end in March 2007, or until the next shutdown of sufficient duration to allow for unit cooler fan repairs, whichever comes first.

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/

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

Docket No. 50-353

Enclosures: 1. Amendment No. 145 to
License No. NPF-85
2. Safety Evaluation

cc w/encls: See next page

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EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-353

LIMERICK GENERATING STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 145
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 9, 2006, as supplemented by letters by June 16 and June 23, 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 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. 145, are hereby incorporated into this license. Exelon Generation Company, LLC 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 14 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

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 and License

Date of Issuance: July 7, 2006

ATTACHMENT TO LICENSE AMENDMENT NO.145

FACILITY OPERATING LICENSE NO. NPF-85

DOCKET NO. 50-353

Replace the following page of the Facility Operating License No. NPF-85 with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove
3

Insert
3

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 NO.145 TO FACILITY OPERATING

LICENSE NO. NPF-85

EXELON GENERATION COMPANY, LLC

LIMERICK GENERATING STATION, UNIT 2

DOCKET NO. 50-353

1.0 INTRODUCTION

By application dated June 9, 2006 (Agencywide Documents and Management System (ADAMS) Accession No. ML061630029), as supplemented by letters dated June 16 (ML061730107) and June 23, 2006, the Exelon Generation Company, LLC (the licensee,) requested changes to the Technical Specifications (TSs) for the Limerick Generating Station, Unit 2 (LGS Unit 2). The supplements dated June 16 and June 23, 2006, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the Nuclear Regulatory Commission (NRC) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on June 20, 2006 (71 FR 35453).

The proposed changes would revise TS Limiting Condition for Operation (LCO) 3.6.1.7 by adding a footnote to the TS limit for drywell average air temperature of 145 degrees Fahrenheit (°F) to allow continued operation of LGS, Unit 2, with drywell average air temperature no greater than 148 °F for the remainder of the current operating cycle (Cycle 9), which is currently scheduled to end in March 2007, or until the next shutdown of sufficient duration to allow for unit cooler fan repairs, whichever comes first.

2.0 BACKGROUND

The LGS, Unit 2 drywell cooling system consists of eight unit coolers (2A, 2B, 2C, 2D, 2E, 2F, 2G, and 2H) each of which contains two redundant cooling coils and fans. According to the LGS Updated Final Safety Analysis Report (UFSAR), one fan in each unit cooler is normally operating, with the second fan on standby. On loss of the operating fan, the standby fan starts automatically, sensed by a low air flow switch in the discharge duct from the unit cooler. The drywell air cooling system is designed to remove heat from the drywell during normal operation (non safety-related function), and to maintain air circulation and a thoroughly mixed condition under accident conditions (safety-related function). The coolers 2A, 2B, 2G, and 2H are safety-related, whereas the coolers 2C, 2D, 2E, and 2F are non safety-related.

TS 3.6.1.7 specifies that the drywell average air temperature shall not exceed 145 °F during OPERATIONAL CONDITIONS 1, 2, and 3. With the temperature greater than 145 °F, reduce the temperature to within the limit within 8 hours or be in at least HOT SHUTDOWN within next

12 hours and in COLD SHUTDOWN within the following 24 hours. The limitation on drywell average air temperature ensures that the containment peak air temperature does not exceed the drywell design temperature of 340 °F during postulated accident conditions.

In the TS amendment request, the licensee stated that on October 24, 2005, one of the 2D drywell unit cooler fans (2D1V212) failed and was removed from service. The redundant 100% capacity fan was placed in service and the drywell average air temperature was maintained at approximately 129 °F. On April 2, 2006, the second fan (2D2V212) for the 2D unit cooler also failed, and was removed from service. As a result, the drywell average air temperature rose from approximately 129 °F to approximately 142 °F. Plant action, to lower the chilled water supply temperature to lower operating band, has helped in lowering the drywell average air temperature to approximately 140.5 °F based on comparable environmental conditions.

Historically, LGS has experienced an increase in the drywell average air temperature of 2 - 4 °F during the summer months with normal drywell air cooling system operation. Under the current plant condition, this could result in the potential to exceed the TS limit of 145 °F.

At this time, the licensee is not requesting to increase the TS limit for the drywell average air temperature on a permanent basis. Both fans being out of service at the same time during normal plant operation is considered to be an infrequent occurrence. In addition, there is insufficient time to completely re-evaluate the environmental qualification of structures, systems, and components (SSCs) in the drywell for operating at the higher average air temperature on a permanent basis prior to reaching the summer months.

The proposed one-time TS amendment would add a footnote to the TS limit of 145 °F to allow continued operation of LGS Unit 2, with drywell average air temperature no greater than 148 °F for no longer than the remainder of current operating cycle (Cycle 9), and would prevent a TS required shutdown due to degraded condition of the non safety-related drywell air cooling system.

3.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Appendix A, Part 50, General Design Criterion (GDC) 16, "Containment design," requires that the reactor containment and associated systems be provided to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require. Additionally, 10 CFR Part 50, Appendix A, GDC 50, "Containment design basis," requires that the reactor containment structure be designed so that the containment structure and its internal compartments can accommodate the calculated pressure and temperature conditions resulting from any loss-of-coolant accident (LOCA). The current containment analysis for LGS, Unit 2, is based upon an initial drywell average air temperature of 150 °F, and demonstrates that neither the drywell design temperature of 340 °F nor the drywell design pressure of 55 psig would be exceeded during a design-basis accident (DBA). Thus, the proposed one-time TS limit of 148 °F for drywell average air temperature for no longer than the remainder of the current operating cycle would not require a change to the current containment analysis, and therefore, would not result in peak containment parameters exceeding their design values during a DBA. Based on this evaluation, the requirements of GDC 16 and GDC 50 would continue to be satisfied as a result of the proposed change.

Appendix A of 10 CFR Part 50, Appendix A, GDC 4, "Environmental and dynamic effects design bases," requires that SSCs important to safety be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including LOCAs. The design temperature for Seismic Category I structures has been evaluated and determined that an initial drywell average air temperature of 150 °F would not adversely affect the ability of any Seismic Category I structure to perform its design function. Therefore, the proposed change is consistent with the design basis of SSCs in the drywell, and the requirements of GDC 4 would continue to be satisfied as a result of the proposed change.

Pursuant to 10 CFR 50.49, "Environmental qualification of electric equipment important to safety for nuclear power plants," requires that each holder of a license for a nuclear power plant establish a program for qualifying the electrical equipment defined in paragraph (b) of this regulation. Paragraph (e)(1) of 10 CFR 50.49 requires that the time-dependent temperature and pressure at the location of the electrical equipment important to safety must be established for the most severe DBA during or following which the equipment is required to remain functional. For components in the drywell, the qualified life was based on operation at a minimum drywell average air temperature of 145 °F. An evaluation of the qualified life of components in the drywell has been performed and has determined that current qualification will not be adversely impacted even if the components are exposed to a temperature of 150 °F for the remainder of the current operating cycle. The impact of localized drywell temperatures exceeding 150 °F, as identified through the normal drywell average air temperature monitoring performed in accordance with TS Surveillance Requirement (SR) 4.6.1.7, has been evaluated. Therefore, the components in the drywell will remain within the limitations of the Environmental Qualification program which will continue to ensure that the requirements of 10 CFR 50.49 are satisfied.

4.0 TECHNICAL 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 DBA; and 2) the potential to exceed the temperature qualification for mechanical and electrical safety-related SSCs in the drywell.

4.1 Analysis of Peak Containment Parameters

The TS limit for drywell average air temperature is important in that it establishes the initial drywell air temperature condition which provides assurance that the peak containment analysis parameters will not be exceeded during a postulated DBA. The licensee stated that the drywell design temperature of 340 °F was selected to ensure containment integrity and that SSCs required to mitigate the consequences of a DBA would be capable of performing their design functions at this temperature.

Section 6.2.1.8 of the LGS Updated Final Safety Analysis Report (UFSAR) states that the current LGS containment design was evaluated during power uprate for the DBA LOCA. The LGS UFSAR states that the containment analyses were performed at 102% of rated thermal power in accordance with Regulatory Guide 1.49, entitled "Power Levels of Nuclear Power Plants," using General Electric codes and models that have been approved by the NRC for

plant-specific licensing applications. Table 6.2-4A of the LGS UFSAR lists the significant input parameters and initial conditions for the power uprate containment analyses. This table shows that the current short- and long-term containment analyses for LGS are based on an initial drywell average air temperature of 150 °F. These containment analyses show that, given an initial drywell average 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. The LGS UFSAR Table 6.2-5A shows that these containment analyses peak suppression pool temperature is within the suppression pool structural design value of 220 °F, and does not exceed the low pressure emergency core cooling system pump net positive suction head limit of 212 °F.

The proposed change of drywell average air temperature to 148 °F is 2 °F lower than the temperature used for the containment analysis (150 °F). In response to NRC staff's request for additional information, the licensee stated in an email, dated June 23, 2006 (ADAMS Accession No. ML061740237), that the tolerance for the LGS Unit 2 drywell temperature elements was ± 1.1 °F. Thus, the tolerances for the temperature elements is less than the margin of temperature between the proposed TS value and the value used for the containment analysis. Therefore, the NRC staff concluded that the proposed one-time TS limit of 148 °F for drywell average air temperature for no longer than the remainder of the current operating cycle would not result in peak containment parameters exceeding their design values during a DBA. The staff concluded that 10 CFR Part 50, Appendix A, GDC 16 and 50 would continue to be satisfied as a result of the proposed change.

4.2 Mechanical and Structural Drywell SSC Design Basis

The TS limit for drywell average air temperature also ensures that the design basis for safety-related mechanical and structural SSCs in the drywell is not exceeded. The mechanical and structural SSCs in the drywell were previously evaluated up to a drywell average air temperature of 150 °F (LGS UFSAR Table 3.8-3). Thus, after accounting for the tolerances for the LGS Unit 2 drywell temperature elements (± 1.1 °F), the proposed drywell average air temperature of 148 °F is within the containment parameters envelope for evaluating the mechanical and structural SSCs in the drywell.

4.3 Impact on Peak Containment Temperature and Pressure during a DBA

Table 6.2-4A of the LGS UFSAR indicates that the current short- and long-term containment analyses for LGS are based upon an initial drywell average air temperature of 150 °F (2 °F above 148 °F TS amendment request). Therefore, the NRC staff considers neither the drywell design temperature of 340 °F nor the drywell design pressure of 55 psig would be exceeded during a DBA, due to the drywell average air temperature increase from 145 °F to 148 °F.

4.4 Impact Due to Localized Elevated Drywell Temperature on the Safety-Related Components

On June 16, 2006, the licensee submitted additional information stating that Limerick has high confidence in the ability of remaining unit coolers to continue to perform their intended safety-related and non safety-related design functions. The fans associated with safety-related unit coolers are tested once every quarter in accordance with the TS SR 4.6.6.2 to demonstrate operability of each cooler fan. The licensee also confirmed that the failed cooling fans (2D-V212) are not part of the safety-related portion of the drywell air cooling system.

The NRC staff was concerned about the potential impact of the localized elevated drywell temperature on the safety-related components. The licensee, in its letter dated June 23, 2006, provided a summary of its technical evaluation report "Impact of the Unit 2 Drywell Atmosphere Having Localized Elevated Temperatures Exceeding 150 Degree F."

The licensee stated in the above evaluation report that since the fans of drywell cooler 2D failed, the drywell experienced a temperature of approximately 202 °F at Elevation 320', azimuth 345, and 167 °F at Elevation 320', azimuth 225. Considering an additional increase in the drywell average temperature normally experienced during the summer months (approximately 4 °F), the licensee performed its evaluation based on conservative bounding temperature of 210 °F at Elevation 320', azimuth 345, and 175 °F at Elevation 320', azimuth 225. The evaluation report summarized the following impacts of elevated temperature on the equipment located in relevant area of Elevation 320' (10 feet above and below the Elevation 320'):

4.4.1 Impact on Environmental Qualification (EQ) of Components:

The evaluation determined that there is no EQ equipment in the specified bounded area (the nearest components being at elevation 286').

4.4.2 Impact on Mechanical Equipment

The evaluation determined that other than snubbers (20 total), there are no active safety-related mechanical components within the bounded area. The non-safety-related components within the bounded area are not critical to the plant operation so that the presence of elevated temperature will not impact the function of any safety-related equipment.

The evaluation stated that 4 of the 20 mechanical snubbers (subjected to the elevated temperature), will be added to the list of snubbers requiring maintenance during the next outage. However, these snubbers will continue to provide their safety-related function until the next outage.

4.4.3 Impact on Electrical Items

The evaluation stated that there are 52 cables in the bounded area, but no electrical equipment. The cables are mostly for instrumentation or used for equipment not required during normal operation. The 52 cables with elevated temperatures are not critical to the plant operation or the response of the plant to an accident condition.

4.4.4 Impact on Containment Liner, Structural Steel, and Concrete

The evaluation determined that the structural elements within the drywell remain qualified and capable of performing all their intended functions

5.0 EXIGENT CIRCUMSTANCES

The NRC staff has made a determination that exigent circumstances exist with regard to issuance of a license amendment, in response to the licensee's application dated June 9, 2006, as supplemented by letters dated June 16 and June 23, 2006, as defined in 10 CFR 50.91(a)(6). During normal operation, one fan in the 2D drywell unit cooler is in service and the second fan is in standby. On a loss of the operating fan, the standby fan will automatically start to assure continuous cooling capability. Currently, both fans of the 2D drywell unit cooler are inoperable and out of service, which resulted in an increase in drywell average air temperature from approximately 129 °F to approximately 142 °F. Both fans being out of service at the same time during normal plant operation is considered to be an infrequent occurrence. Historically, LGS has experienced an increase in the drywell average air temperature of 2 - 4 °F during the summer months with normal drywell air cooling system operation. Under the current plant condition, this could result in the potential to exceed the TS limit of 145 °F. The licensee promptly performed a detailed technical evaluation to determine the impact on EQ components, mechanical equipment, and electrical items in the drywell due to localized elevated temperatures. The technical evaluation was completed on June 6, 2006, and determined that the impact on the safety-related components due to the increase in allowed average drywell temperature from 145 °F to 148 °F was acceptable. Subsequently, the licensee's application for amendment was submitted on June 9, 2006. The NRC staff has determined that the licensee expended reasonable efforts to make a timely application to avoid exigency. In addition, the Commission needs to act on the requested amendment prior to expiration of the standard 30-day public comment period due to an anticipation of increase in the drywell average air temperature during the summer months, which could result in an unwarranted plant shutdown.

6.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulation's in 10 CFR 50.92 state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility, in accordance with the amendment, would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, or (2) create the possibility of a new or different kind of accident previously evaluated, or (3) involve a significant reduction in a margin of safety. As required by 10 CFR 50.91(a), the licensee has provided its analysis of the issue of no significant hazards consideration, which is presented below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No. The increase in the allowable drywell average air temperature during normal plant operation does not make any physical changes to the plant. It only permits the plant to operate at a higher drywell average air temperature for a limited period of time, and therefore, does not increase the probability of an accident previously evaluated. This increase in the drywell average air temperature has been evaluated to ensure that the change does not adversely affect the ability of the primary containment to perform its safety related function during accident conditions.

The LGS containment design was previously evaluated using an initial average air temperature of 150 °F for the design basis Loss-of-Coolant Accident (LOCA). The results of this evaluation showed that the peak drywell air temperature does not exceed the limit of 340 °F post-accident and that the peak drywell pressure does not exceed the design limit of 55 psig. In addition, the results of this evaluation showed that the peak suppression pool temperature does not exceed the suppression pool structural design limit of 220 °F, and does not exceed the low pressure Emergency Core Cooling System (ECCS) pump net positive suction head (NPSH) limit of 212 °F. The proposed change is also bounded by the current small line break analysis.

Evaluation of components in the drywell has determined that the proposed one-time increase in the drywell average air temperature does not adversely affect the capability to perform their safety function. For components in the drywell, the qualified life was based on operation at a minimum drywell average air temperature of 145 °F. An evaluation of the qualified life of components in the drywell has been performed and has determined that current qualification will not be adversely impacted even if the components are exposed to a temperature of 150 °F for the remainder of the current operating cycle. The increased average air temperature of the drywell atmosphere does not degrade or compromise any coolant boundaries nor does it degrade or compromise any primary containment boundaries from performing their design functions during or following an accident condition. This proposed change does not result in or require any systems or components to be operated outside of their design limits.

This proposed change does not adversely affect mitigating systems, structures or components, and does not adversely affect the initial conditions of any accidents. Redundancy and diversity of mitigating systems are unchanged as a result of this proposed change. This proposed change does not affect onsite or offsite radiological consequences of any accident previously evaluated in the Safety Analysis Report (SAR).

Therefore, this proposed TS change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No. The one-time increase in the drywell average air temperature proposed by this TS change does not change any SSC of the plant. This TS change does not create new operating or failure modes. The normal operating drywell average air temperature is maintained to prevent the peak temperature/pressure of the primary containment from exceeding the design limit, and to ensure that SSCs perform their safety functions before, during and after accident conditions. A previous evaluation has shown that the limits for the drywell and suppression pool design temperatures and pressures are not exceeded by the proposed change.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No. This proposed change will allow the plant to operate at a higher drywell average air temperature during normal operation for the remainder of the current operating cycle. This higher drywell average air temperature (148 °F) is still below the initial conditions (150 °F) specified in the current short and long-term containment analyses. This change does not create additional heat loads or change the way any of the equipment is operated. A previous evaluation has demonstrated that the drywell and suppression pool design pressures and design temperatures and code requirements are maintained. Therefore, this one-time change to the TS drywell average air temperature limit, to allow the plant to operate no greater than 148 °F for no longer than the remainder of the current operating cycle, does not have any adverse effect on the ability of safety-related SSCs to perform their design functions. The SSCs are designed to function following a LOCA where drywell temperature can peak at 340 °F. For components in the drywell, the qualified life was based on operation at a minimum drywell average air temperature of 145 °F. An evaluation of the qualified life of components in the drywell has been performed and has determined that current qualification will not be adversely impacted even if the components are exposed to a temperature of 150 °F for the remainder of the current operating cycle.

Therefore, this proposed change does not involve a significant reduction in a margin of safety.

Based on the above considerations, the NRC staff concludes that the amendment meets the three criteria of 10 CFR 50.92. Therefore, the NRC staff has made a final determination that the proposed amendment does not involve a significant hazards consideration.

7.0 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.

8.0 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 made a final finding that the amendment involves no significant hazards consideration. Accordingly, the amendment meets the eligibility criteria for categorical

exclusions 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.

9.0 CONCLUSION

Based on the above, the NRC staff finds the proposed one-time change to revise the allowable drywell average air temperature from 145 °F to 148 °F is acceptable.

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: H. Wagege
V. Goel

Date: July 7, 2006