

January 30, 2002

Mr. Oliver D. Kingsley, President
Exelon Nuclear
Exelon Generation Company, LLC
200 Exelon Way, KSA 3-E
Kennett Square, PA 19348

SUBJECT: LIMERICK GENERATING STATION, UNIT 1 - ISSUANCE OF AMENDMENT
RE: EXTENDED USE OF THE FACILITY PRESSURE-TEMPERATURE LIMITS
AND REQUEST TO MODIFY THE REACTOR VESSEL SURVEILLANCE
CAPSULE WITHDRAWAL SCHEDULE (TAC NO. MB2933)

Dear Mr. Kingsley:

The Commission has issued the enclosed Amendment No. 155 to Facility Operating License No. NPF-39 for the Limerick Generating Station, Unit 1. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated September 14, 2001.

This amendment revises the TS Figure 3.4.6.1-1, "Minimum Reactor Vessel Metal Temperature vs. Reactor Vessel Pressure," to extend the use of the reactor pressure vessel (RPV) pressure-temperature limit curves for one additional fuel cycle and approves a modification to the TS Table 4.4.6.1.3-1, "Reactor Vessel Material Surveillance Program - Withdrawal Schedule," RPV surveillance capsule withdrawal schedule.

A copy of our safety evaluation is also enclosed. A 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 No. 50-352

Enclosures: 1. Amendment No. 155 to
License No. NPF-39
2. Safety Evaluation

cc w/encls: See next page

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EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-352

LIMERICK GENERATING STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 155
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 September 14, 2001, 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. 155, are hereby incorporated in the 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 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:

ATTACHMENT TO LICENSE AMENDMENT NO. 155

FACILITY OPERATING LICENSE NO. NPF-39

DOCKET NO. 50-352

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

3/4 4-20

3/4 4-21

Insert

3/4 4-20

3/4 4-21

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 155 TO FACILITY OPERATING LICENSE NO. NPF-57
EXELON GENERATION COMPANY, LLC
LIMERICK GENERATING STATION, UNIT 1
DOCKET NO. 50-352

1.0 INTRODUCTION

By letter dated September 14, 2001, Exelon Generation Company, LLC (EGC or the licensee), the licensee for the Limerick Generating Station (LGS), Unit 1, submitted a request for changes to the LGS Unit 1, Technical Specifications (TSs). The requested changes would modify the LGS Unit 1 reactor pressure vessel (RPV) surveillance capsule withdrawal schedule and extend the use of the facility's RPV pressure-temperature (P-T) limit curves for one additional fuel cycle. The proposed surveillance schedule change would add a note to TS Table 4.4.6.1.3-1, "Reactor Vessel Material Surveillance Program - Withdrawal Schedule," which would permit the surveillance capsule withdrawals to be scheduled for the nearest vessel refueling outage date subsequent to the withdrawal time specified in the TS Table. In addition, the proposed change would extend the current period of validity for the RPV P-T limit curves, TS Figure 3.4.6.1-1, "Minimum Reactor Vessel Metal Temperature vs. Reactor Vessel Pressure," to permit the use of the current curves through the end of the LGS Unit 1 Cycle 10.

2.0 BACKGROUND

2.1 Vessel Surveillance Specimens

Appendix H to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, requires nuclear power plant licensees to implement RPV surveillance programs to "monitor changes in the fracture toughness properties of ferritic materials in the reactor vessel beltline region...which result from exposure of these materials to neutron irradiation and the thermal environment." Appendix H to 10 CFR Part 50 incorporates by reference the editions of the American Society for Testing and Materials (ASTM) Standard Practice E 185, "Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," through the 1982 Edition, for RPV surveillance program design and specimen testing. Under Appendix H to 10 CFR Part 50, the licensee's RPV surveillance program design and withdrawal schedule is required to meet the requirements of the edition of ASTM E 185 that is current on the issue date of the American Society of Mechanical Engineers (ASME) Code to which the RPV was purchased. Later editions of ASTM E 185 also may be used, up to and including the 1982 Edition. However, the test procedures and reporting requirements must meet the requirements of the 1982 Edition of ASTM E 185, to the extent practical for the configuration of the specimens in the capsules.

The LGS Unit 1 RPV surveillance program was designed to the requirements of the 1973 Edition of ASTM E 185 (ASTM E 185-73). ASTM E 185-73 sets forth general requirements

regarding the withdrawal schedule for RPV surveillance capsule programs. Table 1 of ASTM E 185-73 states that the first capsule should be withdrawn, "when the exposure of the capsule corresponds to the calculated exposure of the reactor vessel wall at approximately 100 to 125% of the reactor design life." In implementing their RPV surveillance program, the licensee was previously approved to withdraw the first LGS Unit 1 surveillance capsule at an exposure of 15 effective full-power years (EFPY), as documented in LGS Unit 1 TS Table 4.4.6.1.3-1.

Additional U.S. Nuclear Regulatory Commission (NRC) staff guidance has been published regarding licensee requests to obtain one-cycle capsule withdrawal deferral to support the Integrated Surveillance Program (ISP) proposed by the Boiling Water Reactor Vessel and Internals Project (BWRVIP). The ISP withdrawal schedule proposed by the BWRVIP was originally submitted in Topical Report BWRVIP-78 titled, "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan (BWRVIP-78)," dated December 1999. The original report was later updated in Topical Report BWRVIP-86 titled, "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan," dated December 2000 and modified in the most recent BWRVIP response to the NRC staff's request for additional information (RAI), "Project No. 704 - BWRVIP Response to Second NRC Request for Additional Information on the BWR Integrated Surveillance Program," dated May 30, 2001. The ISP was designed to integrate and share data from the surveillance programs from all existing BWR reactors in the United States. The BWRVIP noted that, for some licensees, it would be necessary to obtain at least one-cycle capsule deferrals to support obtaining high quality data from some existing surveillance capsules. In addition, since some existing surveillance capsules would not need to be tested if the ISP were approved by the staff, licensees having such capsules desired to seek deferral of their removal and testing to reduce monetary expenditures and personnel exposure. The NRC staff has noted its general support for the ISP proposal. The staff's letter to the BWRVIP, "BWR Integrated Surveillance Program (BWRVIP-78) (TAC No. M99894)," dated May 16, 2000, identifies criteria to be addressed by licensees requesting one-cycle capsule withdrawal deferrals to support the ISP.

The first criterion addressed in the staff's May 16, 2000, letter requested that licensees explain how their deferral request is consistent with the ISP plan submitted in Topical Report BWRVIP-78 (which would at this time be superseded by the information submitted in BWRVIP-86 and the May 30, 2001 RAI response). Principally, this criterion requested that licensees examine how their surveillance capsules would be used (or not used) under the proposed ISP and confirm that their request for a one-cycle deferral would not affect the ability of the ISP to meet its objectives. The second criterion requested that licensees provide a justification as to why the materials property data to be acquired from the capsule in question was not necessary to support safe operation of the facility over the period of the deferral. Several options were given in the staff's letter regarding possible responses to this criterion. The staff's third and final criterion requested that licensees explain why the dosimetry data to be acquired from the capsule in question was not necessary to support safe operation of the facility over the period of the deferral.

2.2 Pressure-Temperature (P-T) Limits

The regulation at Appendix G to 10 CFR Part 50 requires licensees to develop and utilize P-T limits in order to "provide adequate margins of safety during any condition of operation, including anticipated operational occurrences and system hydrostatic tests, to which the pressure boundary may be subjected over its service lifetime." Appendix G to 10 CFR Part 50

incorporates by reference the editions of the ASME Code, Section XI, Appendix G, through the 1995 Edition and addenda through the 1996 Addenda, as the basis of the requirements for RPV P-T limit methodology. Appendix G to 10 CFR Part 50 states that P-T limits, "...must be at least as conservative as limits obtained by following the methods of analysis and the margins of Appendix G of Section XI of the ASME Code." The current LGS Unit 1 RPV P-T limit curves have been calculated by the licensee to be acceptable through 32 EFPY. However, NRC staff concerns regarding the adequacy of the licensee's fluence methodology resulted in a one-cycle limit (leading to expiration of the curves at the end of LGS Unit 1 operating Cycle 9 schedule for Spring 2002) being placed on their use when the RPV P-T limit curves were last approved by NRC letter dated September 15, 2000.

2.3 Licensee's Determination

In the September 14, 2001, letter, the licensee stated that their reason for requesting the deferral of the withdrawal and testing of the first LGS Unit 1 surveillance capsule was to support their involvement in the ISP. The licensee then addressed, as described below, the three criteria cited in the NRC staff's May 16, 2000, letter.

Regarding the first criterion, the licensee noted that the LGS Unit 1 surveillance capsules would not be included within the ISP proposed by the BWRVIP. Rather, the LGS Unit 1 limiting RPV materials would be adequately monitored under the proposed ISP by the testing of surveillance plate material from Peach Bottom Atomic Power Station, Unit 2, and by the testing of surveillance weld material from River Bend Station. Therefore, in accordance with the proposed ISP, no LGS Unit 1 capsules would need to be withdrawn during the current LGS Unit 1 license period and deferral of the first LGS Unit 1 surveillance capsule withdrawal for one cycle would have no adverse effect on the proposed ISP.

To address the second criterion, the licensee concluded that the material test data from the capsule to be deferred was not necessary to ensure continued safe operation of the LGS Unit 1 RPV. The licensee stated that data from the surveillance specimen tests, if the surveillance capsule is withdrawn during the facility's spring 2002 refueling outage (corresponding to exposure of approximately 13.45 EFPY), are not expected to demonstrate Charpy shift values which would exceed the scatter inherent in the test method. Therefore, the value of such data for evaluating the integrity of the LGS Unit 1 RPV would be extremely limited. Further, EGC noted that since this would be the first surveillance capsule tested by LGS Unit 1, an insufficient number of valid data points would be available to use plant-specific surveillance data to evaluate LGS Unit 1 RPV material properties using the accepted methodology in NRC Regulatory Guide (RG) 1.99, Revision 2. This methodology, given as "Position C.2.1" in the RG, requires a minimum of two data points (i.e., the testing of two surveillance capsules) for implementation. As a result, the licensee would continue to use the existing P-T limit curves that are in the TS which are based on Regulatory Guide (RG) 1.99, Revision 2, Position 1, "Surveillance Data Not Available."

Finally, regarding the third criterion, the licensee concluded that the dosimetry information from the capsule to be deferred was not necessary to ensure continued safe operation of the LGS Unit 1 RPV. The licensee noted that since they have adopted 32 EFPY P-T limit curves within the LGS Unit 1 TS, the fluence prediction on which these curves are based is for an operating time substantially in excess of where the RPV will be through the period of the capsule deferral. Although the methodology used to calculate the fluence associated with the existing 32 EFPY

curves has been questioned by the NRC staff, the licensee concluded that the calculated 32 EFPY fluence was still expected to conservatively bound the RPV fluence through the period of capsule deferral. In addition, the licensee also confirmed that new RPV fluence calculations had been completed for LGS Unit 1 using an updated and improved fluence methodology. For these reasons, the licensee concluded that their request to defer withdrawal of the first LGS Unit 1 surveillance capsule was justified and consistent with their intent to support the BWRVIP ISP. Likewise, this same argument was given by the licensee as the basis for extending the period of validity of the existing LGS Unit 1 P-T limit curves from through the end of LGS operating Cycle 9 (scheduled to end in spring 2002) to through the end of LGS operating Cycle 10 (scheduled to end in spring 2004).

In order to modify the LGS Unit 1 TS to accommodate deferral of the capsule withdrawal, EGC proposed to add a footnote to TS Table 4.4.6.1.3-1 which reads, "[i]f the designated withdrawal time (EFPY) is reached during an operating cycle, withdrawal of the capsule may be deferred until the next scheduled refueling outage." Since the TS table currently requires removal of the first LGS Unit 1 surveillance capsule at an exposure of 15 EFPY, this footnote would have the effect of permitting the licensee to remove the capsule during their end-of-Cycle 10 refueling outage scheduled for spring 2004 (corresponding to approximately 15.34 EFPY). The modifications to the existing P-T limit curves in LGS Unit 1 TS Figure 3.4.6.1-1 only changed the note on the figure which specifies the period of validity of the P-T limit curves.

3.0 EVALUATION

The NRC staff reviewed the information supplied by the licensee and the regulatory requirements and guidance stated in Section 2.0 above. The staff's conclusions regarding the technical justifications provided to support both the deferral of the first LGS Unit 1 surveillance capsule withdrawal and the one-cycle extension to the period of validity of the LGS Unit 1 P-T limit curves are given below.

First, the staff accepts that deferral of the first LGS Unit 1 capsule withdrawal is consistent with the provisions of the BWRVIP ISP plan. The staff noted that in the most recent revision of the proposed ISP withdrawal schedule, the LGS Unit 1 surveillance capsules are not included within the scope of the proposed ISP. Therefore, the licensee's request to defer the first surveillance capsule for withdrawal during the unit's end-of-Cycle 10 refueling outage scheduled for spring 2004 (corresponding to about 15.34 EFPY) is acceptable since the requested deferral will not adversely effect the proposed ISP.

Second, the staff accepts the justification provided by the licensee in response to why the material property information from the first surveillance capsule is not necessary to support safe operation of the LGS Unit 1 RPV through the period of the deferral. When data from a capsule is not expected to be distinguishable from the scatter in the Charpy test method, this constitutes an acceptable technical justification for capsule withdrawal deferral inasmuch as the data would not be expected to provide information which would support a modification to the assessment of the embrittlement of the RPV. In any event, since the capsule in question would be the first from LGS Unit 1 to be removed and tested, the NRC staff agrees that the information which may be gained from it would, at this time, provide an insufficient basis for making any determination regarding LGS Unit 1 RPV material properties based on plant-specific surveillance data and the accepted methodology from RG 1.99, Revision 2. Hence, continued operation of the LGS Unit 1 RPV based on the generic material property technical basis, in lieu

of plant-specific data, used to develop the current P-T limit curves is acceptable through the period of the deferral.

Finally, regarding the third criterion, the NRC staff finds that there is sufficient margin between the calculated fluence value at 32 EFPY and the projected vessel exposure at about 15 EFPY such that there exists adequate assurance of safety to find the requested P-T limit curve extension acceptable. The requested one-cycle capsule withdrawal deferral is also acceptable because it would only provide verification of the calculated results (the use of calculated results is recommended by the NRC staff) when an NRC staff approved fluence calculational methodology is used. Therefore, the dosimetry information which would be gained by the removal and testing of the first LGS Unit 1 surveillance capsule at the previously approved exposure of 15 EFPY is not necessary to ensure that the facility's RPV can be safely operated through the period of deferral.

The NRC staff concludes that the license amendments to modify the LGS Unit 1 RPV surveillance capsule withdrawal schedule and to extend the period of validity of the existing LGS Unit 1 P-T limit curves for one additional cycle, are acceptable. The licensee should be permitted to modify the LGS Unit 1 TSs as proposed in their September 14, 2001, submittal to reflect these changes.

4.0 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.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes requirements with respect to the installation or use of facility components 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 (66 FR 59506). 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.

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

Principal Contributor: Matthew Mitchell

Date:

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