Exelon Generation®

Michael P. Gallagher
Vice President, License Renewal
Exelon Nuclear

200 Exelon Way
Kennett Square, PA 19348

610 765 5958 Office
610 765 5956 Fax
www.exeloncorp.com

michaelp.gallagher@exeloncorp.com

10 CFR 50
10 CFR 51
10 CFR 54

July 11, 2012

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Limerick Generating Station, Units 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: Response to NRC Request for Additional Information, dated July 10, 2012, related to the Limerick Generating Station License Renewal Application

Reference: 1. Exelon Generation Company, LLC letter from Michael P. Gallagher to NRC Document Control Desk, "Application for Renewed Operating Licenses", dated June 22, 2011
2. Letter from Robert F. Kuntz (NRC) to Michael P. Gallagher (Exelon), "Requests for Additional Information for the review of the Limerick Generating Station, Units 1 and 2, License Renewal Application (TAC Nos. ME6555, ME6556)", dated July 10, 2012

In the Reference 1 letter, Exelon Generation Company, LLC (Exelon) submitted the License Renewal Application (LRA) for the Limerick Generating Station, Units 1 and 2 (LGS). In the Reference 2 letter, the NRC requested additional information to support the staffs' review of the LRA.

Enclosed is the response to this request for additional information.

License Renewal Commitment 46 is modified as shown in Enclosure C. There are no other new or revised regulatory commitments contained in this letter.

If you have any questions, please contact Mr. Al Fulvio, Manager, Exelon License Renewal, at 610-765-5936.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 7-11-2012

Respectfully,

Michael P. Gallagher
Vice President - License Renewal Projects
Exelon Generation Company, LLC

Enclosures: A: Responses to Requests for Additional Information
B: Updates to affected LGS LRA sections
C: LGS License Renewal Commitment List Changes

cc: Regional Administrator – NRC Region I
NRC Project Manager (Safety Review), NRR-DLR
NRC Project Manager (Environmental Review), NRR-DLR
NRC Project Manager, NRR- DORL Limerick Generating Station
NRC Senior Resident Inspector, Limerick Generating Station
R. R. Janati, Commonwealth of Pennsylvania

Enclosure A

Response to Request for Additional Information related to various sections of the LGS License Renewal Application (LRA)

RAI 4.1-3
RAI B.1.4-3

RAI 4.1-3

Background

Title 10 of the *Code of Federal Regulations* (CFR) 54.21(c)(2) states that a list must be provided of plant-specific exemptions granted pursuant to 10 CFR 50.12 and in effect that are based on time-limited aging analyses as defined in 10 CFR 54.3. The applicant shall provide an evaluation that justifies the continuation of these exemptions for the period of extended operation.

Issue

The staff noted that the 32 effective full power year (EFPY) pressure-temperature (P-T) limits were granted for Limerick Generating Station (LGS), Unit 1, for Cycle 9 in License Amendment No. 145 dated September 15, 2000. The 32 EFPY P-T limits were granted for LGS, Unit 2, for Cycle 7 in License Amendment No. 111 dated March 21, 2001. The staff noted that the use of the P-T limits in Tech Spec Figure 3.4.6.1-1, for both units to 32 EFPY was granted on January 2, 2003 for LGS, Unit 1, in License Amendment No. 163 as well as for LGS, Unit 2, in License Amendment No. 125.

License renewal application (LRA) Table 4.1-3 indicates that exemptions associated with Code Cases N-640 and N-588 will not be needed during the period of extended operation because 10 CFR Part 50, Appendix G requires new P-T limits to be developed for higher fluence values that are to be approved by the NRC prior to exceeding 32 EFPY, which is predicted to occur before the period of extended operation.

However, an evaluation to justify the continuation of the exemptions for the period of extended operation has not been provided, as required by 10 CFR 54.21(c)(2), if for any reason the current approved P-T limits would still be in effect during the period of extended operation.

Request

1) Clarify the dates that the exemptions associated with Code Cases N-640 and N-588 for LGS, Units 1 and 2 in LRA Table 4.1-3 were granted. Revise LRA Section 4.1, if applicable.

2) Provide an evaluation that justified the continuation of those exemptions associated with Code Cases N-640 and N-588 in the event that the current approved P-T limits would be in effect during the period of extended operation and revise LRA Sections 4.1 and A.4.1, if applicable.

Exelon Response

1) The exemption request associated with use of Code Cases N-588 and N-640 for LGS Unit 1 was submitted in a letter dated May 15, 2000, as supplemented on May 19, 2000 and August 10, 2000. The NRC approved the exemption in a letter dated September 7, 2000.

   The exemption request associated with the use of Code Case N-640 for LGS Unit 2 was submitted in a letter dated November 20, 2000, as supplemented on December 20, 2000. The NRC approved the exemption in a letter dated March 21, 2001. Enclosure B

contains an update to LRA Table 4.1-3, which corrects the Unit 1 exemption approval date.

The NRC issued License Amendment 163 for Unit 1 and License Amendment 125 for Unit 2 in a letter dated January 2, 2003 that approved use of the 32 EFPY P-T curves out to 32 effective full power years. The Safety Evaluation Report included in the January 2, 2003 letter summarizes the original approval of these P-T limit curves, subsequent restriction of their use for one operating cycle on each unit due to concerns with fluence methodology used, and final approval of the same P-T limit curves for 32 EFPY, based upon subsequent fluence data submitted in an Exelon letter dated June 26, 2002. The P-T limit curves approved by the January 2, 2003 letter are based upon the exemptions described above.

2) Based on EFPY projections described in LRA Section 4.2.1, it is expected that Unit 1 and Unit 2 will exceed 32 EFPY prior to the period of extended operation (PEO), thereby necessitating replacement of the P-T limit curves in accordance with 10 CFR 50, Appendix G, prior to the PEO. However, if 32 EFPY is not reached prior to the PEO for any reason for either unit, the current P-T limit curves and the associated exemptions remain in effect during the PEO. Continuation of this exemption into the PEO is acceptable because the use of Code Case N-640 as a basis for the 32 EFPY P-T limits was approved by the NRC in the letter dated March 21, 2001 without a limitation with respect to plant operation beyond the original license term. In addition, this is justified because the provisions of Code Cases N-588 and N-640 utilized in developing the current P-T limit curves remain acceptable since they were incorporated into the ASME Code, Section XI, Appendix G, in the 1998 Edition through 2000 Addenda, as described in Regulatory Issue Summary 2004-04, dated April 5, 2004, and this Code was approved for use as described in 10 CFR 50.55a(b)(2).

   Enclosure B includes the following three updates to the LRA that reflect the changes described above:

   - LRA Section 4.1.5, "Identification and Evaluation of LGS Exemptions;"
   - LRA Table 4.1-3, "LGS Exemption Evaluation Table;" and
   - UFSAR Supplement Section A.4.1, "TLAA Identification."

RAI B.1.4-3

Background

The response to RAI B1.4-2, provided by letter dated June 19, 2012, stated that the enhancements to the Operating Experience program and Corrective Action Program (CAP) will be implemented within two years following the receipt of the renewed operating license. The staff has reviewed proposed time frame and its basis for the implementation of the programs, as described in the June 19, 2012, response to RAI B1.4-2 and determined it to be acceptable.

Issue

The proposed updated final safety analysis report (UFSAR) supplement states that the "enhancements will be implemented prior to the period of extended operation," which is not as detailed as the proposed dates of implementation in the response to RAI B.1.4-2 of two years following the receipt of the renewed operating license. Further clarification is required to preclude implementing the program as currently described in the proposed UFSAR supplement as opposed to implementing the program consistent with the time frame contained in the response to RAI B1.4-2.

Request

Revise the UFSAR supplement regarding the time frame for the implementation of enhancements to the operating experience and CAP, in order to be consistent with the information contained in the response to RAI B1.4-2, "two years following the receipt of the renewed operating license."

Exelon Response

The LGS UFSAR license renewal supplement, LRA Section A.1.6, has been updated to indicate that the enhancements described in the Exelon March 13, 2012 response to RAI B.1.4-1 will be implemented within two years following receipt of the renewed operating licenses, as shown in Enclosure B. In addition, LRA Section B.1.4 (see Enclosure B) and license renewal Commitment 46 (see Enclosure C) have been updated to also reflect this implementation schedule.

Enclosure B
LGS License Renewal Application Updates

Notes:

- To facilitate understanding, portions of the original LRA have been repeated in this Enclosure, with revisions indicated.
- Text from the original LRA or previous RAI responses is shown in normal font. Changes are highlighted with ***bold italics*** for inserted text and strikethroughs for deleted text.

As a result of the response to RAI 4.1-3 provided in Enclosure A of this letter, LRA Section 4.1.5, "Identification and Evaluation of LGS Exemptions," and UFSAR Supplement Section A.4.1, "Identification of Time-Limited Aging Analyses," are revised as shown below:

4.1.5 IDENTIFICATION AND EVALUATION OF LGS EXEMPTIONS

10 CFR 54.21(c)(2) states: A list must be provided of plant-specific exemptions granted pursuant to 10 CFR 50.12 and in effect that are based on time-limited aging analyses as defined in 10 CFR 54.3. The applicant shall provide an evaluation that justifies the continuation of these exemptions for the period of extended operation. A search of docketed correspondence, the operating license, and the Updated Final Safety Analysis Report (UFSAR) identified the exemptions in effect that are based upon a time-limited aging analysis. These exemptions are shown ***and justified for continuation during the period of extended operation*** in Table 4.1-3. ~~Neither of these two exemptions is required for the period of extended operation.~~ They are associated with Pressure-Temperature (P-T) limits developed using exemptions to 10 CFR 50, Appendix G, to permit use of ASME Code Cases N-588 and N-640. ~~Since the current P-T limits are only valid for 32 Effective Full Power Years (EFPY), they must be replaced prior to the period of extended operation, as described in Section 4.2.1. Therefore, these exemptions will not be required during the period of extended operation.~~

Table 4.1-3 – LGS EXEMPTION EVALUATION TABLE

LGS Unit / *Exemption Approval* Date	**Exemption Description**	**Based upon TLAA?**	**In Effect during PEO?**
Unit 1 ***9/7/2000*** ~~5/15/2000~~	The NRC has granted a substantive exemption to 10 CFR 50.60(a) and 10 CFR 50 Appendix G to permit the use of Code Cases N-588 and N-640 for development of P-T limits. Code Case N-588 permits the postulation of a circumferentially-oriented flaw (in lieu of an axially-oriented flaw) for the evaluation of circumferential reactor pressure vessel (RPV) welds. Code Case N-640 permits the use of an alternate fracture toughness curve for reactor vessel materials in determining the P-T limits. ***The exemption was approved by the NRC for Unit 1 in a letter dated September 7, 2000. The exemption supported the generation of the current Unit 1 P-T limit curves, which are valid to 32 EFPY, as approved by the NRC in LGS Unit 1 License Amendment No. 163 in a letter dated January 2, 2003. Based on EFPY projections described in LRA Section 4.2.1, it is expected that Unit 1 will exceed 32 EFPY prior to the period of extended operation (PEO). However, if 32 EFPY is not reached prior to the PEO for any reason, the current P-T limits and this exemption remain in effect during the PEO. Continuation of this exemption into the PEO is acceptable because the use of Code Cases N-588 and N-640 as a basis for the 32 EFPY P-T limits was approved by the NRC in a letter dated September 7, 2000 without a limitation with respect to plant operation beyond the original license term. In***	Yes	~~No~~ ***See Note 1***

Table 4.1-3 – LGS EXEMPTION EVALUATION TABLE			
LGS Unit / *Exemption Approval* Date	**Exemption Description**	**Based upon TLAA?**	**In Effect during PEO?**
	addition, the provisions of Code Case N-588 and N-640 used in developing the current P-T limit curves remain acceptable since they were incorporated into the ASME Code Section XI, Appendix G, in the 1998 Edition through 2000 Addenda, as described in Regulatory Issue Summary 2004-04, dated April 5, 2004, and this Code was approved for use as described in 10 CFR 50.55a(b)(2). ~~The current exemption will not be needed during the period of extended operation (PEO) because 10 CFR 50, Appendix G, requires new P-T limits to be developed for higher fluence values that are to be approved by the NRC prior to exceeding 32 EFPY, which is predicted to occur before the PEO.~~ See Section 4.2.1 and Section 4.2.4 for additional information.		
Unit 2 3/21/2001	The NRC has granted a substantive exemption to 10 CFR 50.60(a) and 10 CFR 50, Appendix G, to allow use of ASME Code Case N-640 to support a change to LGS Technical Specification Figure 3.4.6.1-1, "Minimum Reactor Vessel Temperature versus Reactor Vessel Pressure." ***The exemption was approved by the NRC for Unit 2 in a letter dated March 21, 2001. The exemption supported the generation of the current Unit 2 P-T limit curves, which are valid to 32 EFPY, as approved by the NRC in LGS Unit 2 License Amendment No. 125 in a letter dated January 2, 2003. Based on EFPY projections described in LRA Section 4.2.1, it is expected that Unit 2 will exceed 32 EFPY prior to the period of extended operation (PEO). However, if 32 EFPY is not reached prior to the PEO for any reason, the current P-T limits and this exemption remain in effect during the PEO. Continuation of this exemption into the PEO is acceptable because the use of Code Case N-640 as a basis for the 32 EFPY P-T limits was approved by the NRC in a letter dated March 21, 2001 without a limitation with respect to plant operation beyond the original license term. In addition, this is justified because the provisions of Code Case N-640 utilized in developing the current P-T limit curves remain acceptable since they were incorporated into the ASME Code, Section XI, Appendix G, in the 1998 Edition through 2000 Addenda, as described in Regulatory Issue Summary 2004-04, dated April 5, 2004, and this Code was approved for use as described in 10 CFR 50.55a(b)(2).*** ~~The current exemption will not be needed during the PEO because 10 CFR 50, Appendix G, requires new P-T limits to be developed for higher fluence values that are to be approved by the NRC prior to exceeding 32 EFPY, which is predicted to occur prior to the PEO.~~ See Section 4.2.1 and Section 4.2.4 for additional information.	Yes	~~No~~ ***See Note 1***

Note 1: As explained above, it is expected that continuation of these exemptions into the PEO will not be required. However, if the current P-T limits remain bounding during the PEO, the exemptions remain in effect, as justified above.

A.4.1 Identification of Time-Limited Aging Analyses

As part of the application for a renewed license, 10 CFR 54.21(c) requires that an evaluation of Time-Limited Aging Analyses (TLAAs) for the period of extended operation be provided.

10 CFR 54.21(c)(2) requires that the application for a renewed license include a list of plant-specific exemptions granted pursuant to 10 CFR 50.12 and in effect that are based upon TLAAs as defined in 10 CFR 54.3. It also requires an evaluation that justifies the continuation of these exemptions for the period of extended operation. Only two exemptions were identified that are based upon a TLAA~~, but neither of these exemptions is required for the period of extended operation~~. These were associated with Pressure-Temperature (P-T) limits developed using exemptions to 10 CFR 50 Appendix G to permit use of ASME Code Cases N-588 and N-640. ~~Since the current P-T limits are only valid for 32 Effective Full Power Years (EFPY), they must be superseded prior to the period of extended operation. Therefore, the current exemptions will not be required during the period of extended operation.~~ ***Continuation of these exemptions into the PEO is acceptable because the use of Code Cases N-588 and N-640 as a basis for the 32 EFPY P-T limits was approved by the NRC without a limitation with respect to plant operation beyond the original license term. In addition, this is justified because the provisions of Code Cases N-588 and N-640 utilized in developing the current P-T limit curves remain acceptable since they were incorporated into the ASME Code, Section XI, Appendix G, in the 1998 Edition through 2000 Addenda, as described in Regulatory Issue Summary (RIS) 2004-04, and this Code was approved for use as described in 10 CFR 50.55a(b)(2).***

As a result of the response to RAI B.1.4-3 provided in Enclosure A of this letter, LRA Sections A.1.6 and B.1.4 are revised as shown below:

A.1.6 OPERATING EXPERIENCE

The Operating Experience program is an existing program that will be enhanced to ensure, through the ongoing review of both internal and external operating experience, that the license renewal aging management programs are effective to manage the aging effects for which they are credited throughout the period of extended operation. The programs are either enhanced or new programs developed when the review of operating experience indicates that the existing programs do not provide reasonable assurance that aging effects are being effectively managed.

The Operating Experience program will be enhanced to:

1. Explicitly require the review of operating experience for aging-related degradation.

2. Establish criteria to define aging-related degradation.

3. Establish identification coding for use in identification, trending and communications of aging-related degradation.

4. Require communication of significant internal aging-related degradation, associated with SSCs in the scope of license renewal, to other Exelon plants and to the industry. Criteria will be established for determining when aging-related degradation is significant.

5. Require review of external operating experience for information related to aging management, and evaluation of such information for potential improvements to LGS aging management activities.

6. Provide training to those responsible for screening, evaluating and communicating operating experience items related to aging management.

These enhancements will be implemented ***within two years following receipt of the renewed operating licenses***~~prior to the period of extended operation~~.

B.1.4 OPERATING EXPERIENCE

Operating experience is used at LGS to enhance plant programs, prevent repeat events, and prevent events that have occurred at other plants from occurring at LGS. Limerick, as part of the Exelon fleet, receives Operating Experience (internal and external to Exelon Nuclear) daily. The Operating Experience process (OPEX) screens, evaluates, and acts on operating experience documents and information to prevent or mitigate the consequences of similar events. The OPEX process reviews operating experience from external (also referred to as industry operating experience) and internal (referred to as in-house operating experience) sources. External operating experience includes INPO documents (e.g., SOERs, SERs, SENs, etc.), NRC documents (e.g., GLs, LERs, INs,

etc.), and other documents (e.g., 10 CFR Part 21 Reports, etc.). Internal operating experience includes event investigations, trending reports, and lessons learned from in-house events as captured in self-assessments, and in the 10 CFR Part 50, Appendix B corrective action program.

Each AMP summary in this appendix contains a discussion of operating experience relevant to the program. This information was obtained through the review of in-house operating experience captured by the Corrective Action Program, Program Self-Assessments, Program Health Reports, and through the review of industry operating experience. Additionally, operating experience was obtained through interviews with system engineers, program engineers, and other plant personnel. New programs utilized plant and or industry operating experience as applicable, and discussed the operating experience and associated corrective actions as they relate to implementation of the new program. The operating experience in each AMP summary identifies past corrective actions that have resulted in program enhancements and provides objective evidence that the effects of aging have been, and will continue to be, adequately managed.

As described above, the existing Operating Experience process, in conjunction with the Corrective Action Program, has proven to be effective in learning from adverse conditions and events, and improving programs that address aging-related degradation. In order to provide additional assurance that internal and external operating experience related to aging management continues to be used effectively during the period of extended operation, Limerick will enhance its Operating Experience Program to:

1. Explicitly require the review of operating experience for aging-related degradation.

2. Establish criteria to define aging-related degradation. In general, the criteria will be used to identify aging that is in excess of what would be expected, relative to design, previous inspection experience and the inspection intervals.

3. Establish identification coding for use in identification, trending and communications of aging-related degradation. This coding will assist plant personnel in ensuring that, in addition to addressing the specific issue, the adequacy of existing aging management programs is assessed. Station personnel are required to periodically assess the performance of the aging management programs, including insights obtained through operating experience. This could lead to AMP revisions or the establishment of new AMPs, as appropriate.

4. Require communication of significant internal aging-related degradation, associated with SSCs in the scope of license renewal, to other Exelon plants and to the industry. Criteria will be established for determining when aging-related degradation is significant.

5. Require review of external operating experience for information related to aging management, and evaluation of such information for potential improvements to LGS aging management activities. License Renewal Interim Staff Guidance (LR-ISG) documents will be reviewed as part of this external operating experience information as they are issued on an ongoing basis, capturing new insights or addressing issues that emerge from license renewal reviews. Other guidance documents such as GALL Revisions may not be explicitly considered unless communicated in the form of one of the above-listed NRC communication vehicles (e.g., RIS).

6. Provide training to those responsible for screening, evaluating and communicating operating experience items related to aging-related degradation to enhance the effectiveness of this aspect of the operating experience process. This training will be commensurate with their role in the process.

These enhancements will be implemented ***within two years following receipt of the renewed operating licenses***~~prior to the period of extended operation~~.

Enclosure C

LGS License Renewal Commitment List Changes

This Enclosure includes an update to the LGS LRA Appendix A, Section A.5 License Renewal Commitment List, as a result of the Exelon response to RAI:

RAI B.1.4-3

Note: For clarity, portions of the original LRA License Renewal Commitment List text are repeated in this Enclosure. Added text is shown in ***Bold Italics.***

As a result of the response to RAI B.1.4-3 provided in Enclosure A of this letter, Table A.5 of the LRA is revised as shown below:

A.5 License Renewal Commitment List

NO.	PROGRAM OR TOPIC	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE
46	Operating Experience	The Operating Experience Program is an existing program that will be enhanced to: 1. Explicitly require the review of operating experience for aging-related degradation. 2. Establish criteria to define aging-related degradation. 3. Establish identification coding for use in identification, trending and communications of aging-related degradation. 4. Require communication of significant internal aging-related degradation, associated with SSCs in the scope of license renewal, to other Exelon plants and to the industry. Criteria will be established for determining when aging-related degradation is significant. 5. Require review of external operating experience for information related to aging management, and evaluation of such information for potential improvements to LGS aging management activities. 6. Provide training to those responsible for screening, evaluating and communicating operating experience items related to aging management.	Program to be enhanced ***within two years following receipt of the renewed operating licenses.*** ~~prior to the period of extended operation.~~	Section A.1.6 LGS Letter dated March 1~~2~~***3***, 2012 RAI B.1.4-1 RAI A.1-1 ***LGS Letter dated 7/11/2012*** ***RAI B.1.4-3***