UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 15, 2017

Mr. Bryan C. Hanson
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: LIMERICK GENERATING STATION, UNIT 2 – ISSUANCE OF AMENDMENT RE: PARTIAL LENGTH FUEL ROD BURNUP (CAC NO. MF8958)

Dear Mr. Hanson:

The U.S. Nuclear Regulatory Commission (NRC or the Commission) has issued the enclosed Amendment No. 186 to Renewed Facility Operating License No. NPF-85 for the Limerick Generating Station (LGS), Unit 2, in response to your application dated December 20, 2016 (Agencywide Documents Access and Management (ADAMS) Accession No. ML16355A263).

The amendment authorizes the use of the release fractions listed in Tables 1 and 3 of NRC Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors" (ADAMS Accession No. ML003716792), for a limited number of partial length fuel rods that are currently in the LGS, Unit 2, Cycle 14, reactor core for the remainder of the current operating cycle and subsequent fuel movements.

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

Sincerely,

V. Sreenivas, Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-353

Enclosures:
1. Amendment No. 186 to NPF-85
2. Safety Evaluation

cc w/enclosures: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-353

LIMERICK GENERATING STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 186
Renewed License No. NPF-85

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Exelon Generation Company, LLC (the licensee), dated December 20, 2016, 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, by Amendment No. 186, Renewed Facility Operating License No. NPF-85 is hereby amended to allow the use of the release fractions listed in Tables 1 and 3 of NRC Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," for a limited number of partial length fuel rods currently in the Cycle 14 reactor core for the remainder of the current operating cycle and subsequent fuel movements.

3. This license amendment is effective as of its date of issuance and shall be implemented prior to exceeding the burnup limit in the current operating Cycle 14.

FOR THE NUCLEAR REGULATORY COMMISSION

James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Date of Issuance: March 15, 2017

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 186

TO RENEWED 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 December 20, 2016 (Reference 1), Exelon Generation Company, LLC (the licensee) submitted a license amendment request (LAR) for the Limerick Generating Station (LGS), Unit 2.

The proposed amendment authorizes the use of the release fractions listed in Tables 1 and 3 of U.S. Nuclear Regulatory Commission (NRC or the Commission) Regulatory Guide (RG) 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors" (Reference 2), for a limited number of part length fuel rods (PLRs) that are currently in the LGS, Unit 2, Cycle 14, reactor core for the remainder of the current operating cycle and subsequent fuel movements. These PLRs currently reside in the reactor core and are expected to exceed 62,000 megawatt days per metric ton of uranium (MWd/MTU), which is the current rod peak burnup limit specified in footnotes 10 and 11 of RG 1.183 for use of the release fractions in Tables 1 and 3. Therefore, this amendment would allow the PLRs to exceed 62,000 MWd/MTU in the LGS, Unit 2, Cycle 14, while the licensee continues to use the release fractions listed in Tables 1 and 3 of RG 1.183 in its alternative source term (AST) analyses.

2.0 REGULATORY EVALUATION

The NRC used the following requirements and guidance documents in evaluating the LAR:

- Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.67, "Accident source term," in which the NRC established its regulatory requirements that licensees could use to revise the source term used in their design-basis radiological analyses. This section presents requirements that must be met for reevaluations of the consequences of design-basis accidents (DBAs) in which they utilize the AST methodology. RG 1.183 provides an AST that would be acceptable to the NRC staff to use in meeting the requirements of 10 CFR 50.67, which the licensee committed to adopt in its AST implementation.

- NUREG-0800, "Standard Review Plan," Section 15.0.1, Revision 0, "Radiological Consequence Analyses Using Alternative Source Terms," July 2000 (Reference 3). The

NRC staff review was performed consistent with Section 15.0.1 (Revision 0) to the SRP, and a number of other regulatory requirements that are potentially applicable if there is a change in the radiological consequences of the DBAs being evaluated with the AST (see Section II of Acceptance Criteria of SRP 15.0.1 for a list). The licensee provided a justification in which the potential radiological impacts of the proposed operating condition are bounded by the current licensing basis. Since the limiting radiological consequences are unchanged, the staff did not repeat the evaluation for those regulatory requirements that was performed for the initial AST implementation.

- RG 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," July 2000, established NRC guidance for an acceptable AST methodology to meet the requirements of 10 CFR 50.67. The existing approach using the Technical Information Document (TID)-14844 (Reference 4) source term was evaluated and found to be adequate, so licensees were not required to reanalyze their current licensing basis. However, licensees had the option of adopting the guidance in RG 1.183 to reanalyze some or all of their DBAs. Section 3 of RG 1.183 describes an AST that is acceptable to the NRC staff.

3.0 TECHNICAL EVALUATION

The licensee provided an evaluation that demonstrates that the release fractions, radioisotope inventories, and dose consequences are bounded by the current radiological consequences analyses of record (AOR). As a result, no further analyses or reviews of the radiological consequences would need to be performed. Therefore, the NRC staff's review focused on the licensee's justification for its conclusion that the aforementioned key inputs to the radiological consequence analyses do not need to use higher (more conservative) values. Since the licensee only utilizes the AST methodology for the loss-of-coolant accident (LOCA), main steamline break (MSLB), fuel-handling accident (FHA), and control rod drop accident (CRDA) analyses, these were the only DBAs considered by the staff.

3.1 Potential Impacts of Proposed Change

Increasing the burnup of a fuel rod has several impacts that may affect the release fractions and/or the radioisotope inventory during different phases of a DBA. They include:

a. An increase in the cumulative number of fissions that have occurred in the fuel rod, which results in more fission products. This directly increases the total amount of radioisotope inventory available for release.

b. Changes in the fuel pellet geometry, which may result in a change in the percentage of noble gases, iodine, and cesium produced by fission that migrates from the fuel matrix to the gap. This affects the release fraction for these isotopes during the gap release phase of a DBA.

c. Increased fragmentization of the fuel pellet geometry, which may result in the potential for ejection of fuel fragments when the cladding fails. This affects the release fraction for the gap release phase of a DBA.

d. An increase in fuel rod pressure, which may increase the probability of failure. This would affect the quantity of radioisotopes assumed to have been released.

Each of these possible impacts to the release fractions and/or radioisotope inventory for the three DBAs are evaluated in the following subsections.

3.2 Loss-of-Coolant Accident Radiological Consequences

The LAR submittal included an analysis of the impact to the radiological consequences due to a LOCA as part of the licensee's evaluation of the proposed change. In summary, the licensee performed a cycle-specific evaluation for LGS, Unit 2, Cycle 14, that determined the LOCA dose when substituting full length rods (FLRs) for PLRs in the calculation of the total core activity. The licensee used the Table 1 release fractions in RG 1.183 for this evaluation, with the justification that the axial burnup distributions for the PLRs were not significantly different from the lower two-thirds of the FLRs. Therefore, the licensee expects that the addition of the extra core activity would more than compensate for the increased burnups of the PLRs.

The current design-basis LOCA radiological consequences analysis for LGS, consistent with RG 1.183, assumes a maximum hypothetical accident in which all fuel rods are assumed to fail. RG 1.183 indicates that the core average inventory should be used, given that the assumed operating conditions at the time of the accident will bound allowed operation to end of cycle (including emergency core cooling system evaluation uncertainties). PLRs exceeding a burnup of 62,000 MWd/MTU would not result in a significant change in the available radioisotope inventory for release because the inventory available in the PLRs would be included in the total calculation of the core radioisotope inventory.

Fuel pellet geometry changes, as a result of burnup, are the primary motivation behind the 62,000 MWd/MTU burnup limit on use of the release fractions in RG 1.183. NUREG/CR-6703, "Environmental Effects of Extending Fuel Burnup Above 60 GWd/MTU" (Reference 5), was published shortly after RG 1.183 was issued and investigated release fractions for high burnup fuel. The findings supported the acceptability of the RG 1.183 release fractions for fuel with peak rod burnups of up to 62,000 MWd/MTU. At this time, the regulatory guidance did not consider the use of PLRs in boiling-water reactor fuel assemblies. Fuel pellet geometry changes are strongly dependent on local burnup characteristics. The LAR included information demonstrating that: (1) the power history for the PLRs would not exceed the 6.3 kilowatts/feet restriction above burnups of 54 GWd/MTU, as specified in footnote 11 to RG 1.183; and (2) the maximum burnup for the PLRs would only be 2.4 percent higher than the maximum burnup for the equivalent axial segment for the highest-exposed FLR in the same fuel assembly. The licensee indicated that the maximum rod average burnup projected for all PLRs was 62,130 MWd/MTU, which is only 130 MWd/MTU beyond the burnup limit on use of the release fractions. Therefore, any potential increase in release fractions beyond that considered in the conclusions of NUREG/CR-6703 would be expected to be very minor.

The licensee also performed an LGS, Unit 2, Cycle 14, specific evaluation of the post-LOCA control room dose by assuming that the activities of all PLRs in the affected batch of assemblies were replaced by the activities corresponding to FLRs. The licensee appears to have applied this adjustment to all PLRs in the affected GNF2 fuel ("long" and "short" PLRs), but it is not clear if the batch designation only refers to the four affected fuel assemblies or if it refers to a larger group of fuel assemblies with common neutronic design characteristics. Nevertheless, if the analysis only replaced all long PLRs with FLRs for the four affected fuel assemblies, this would have resulted in an increase in dose for the gap release phase equivalent to a tripling of the gap release fractions of the eight PLRs exceeding the 62 GWd/MTU burnup limit. The resulting control room dose was bounded by the AOR. Since the maximum projected burnup is only 130 MWd/MTU above the burnup limit specified in RG 1.183 for the applicability of the release

fractions, and the licensee demonstrated that a significant increase in release fractions could still be supported by the AOR, the NRC staff finds that reasonable assurance exists that allowing the eight PLRs to exceed the 62 GWd/MTU burnup limit will not invalidate the conclusions of the AOR.

After issuance of NUREG/CR-6703, some experiments raised a concern about the potential for fuel fragment dispersion through a breach in the cladding, aided by increased fragmentation of the fuel pellets at high burnups and fuel fragment relocation due to ballooning of the cladding prior to failure. NUREG-2121, "Fuel Fragmentation, Relocation, and Dispersal During the Loss-of-Coolant Accident" (Reference 6), reviewed the available data on this phenomenon and addressed the potential impact on release fractions, and concluded that the existing NRC guidance was acceptable. Since the amount by which the PLRs are projected to exceed the burnup limit is relatively minor (130 MWd/MTU), the NRC staff does not expect a significant enough increase in the potential fuel fragment dispersion to invalidate the applicability of the release fractions in Table 1 of RG 1.183.

Finally, an increased probability for cladding failure during a LOCA due to higher internal rod pressure would not change the conclusions of the LGS evaluation, since its methodology already assumes that all fuel fails. Therefore, the licensee's evaluation bounds any increase in probability for cladding failure due to higher internal rod pressure.

The staff finds that the licensee has demonstrated that: (1) the release fractions from Table 1 of RG 1.183 are acceptable for use, given the minor burnup increment above the limit established in RG 1.183 for applicability, and the conservative evaluation performed to assess the cycle-specific impact on post-LOCA dose; and (2) the core inventory available for release during the postulated LOCA event is determined based on the average core exposure, which remains bounded by the AOR. Therefore, the proposed operation of LGS, Unit 2, Cycle 14, with PLRs exceeding a peak rod burnup limit of 62,000 MWd/MTU, as described in RG 1.183 is acceptable with respect to the postulated radiological consequences from a LOCA.

3.3 Main Steamline Break Radiological Consequences

The LAR submittal does not explicitly discuss the MSLB analyses, although the LGS Updated Final Safety Analysis Report (UFSAR) indicates that the dose consequences of the MSLB event are determined using an AST methodology. However, the UFSAR also indicates that the MSLB event will not result in fuel rod failures. Therefore, the release fractions from Table 3 are not used in the radiological consequence evaluation for an MSLB event. As a result, the MSLB dose consequences are not affected by the PLRs exceeding the 62,000 MWd/MTU burnup limit.

3.4 Fuel Handling Accident Radiological Consequences

The LAR submittal included a discussion of the impact to the radiological consequences due to an FHA. The licensee indicated that an assessment of the activity release from GNF2 fuel was performed, which assumed that all fuel rods in the fuel assembly were FLRs. The core damage fraction determined based on this activity was found to be bounded by the core damage fraction determined using General Electric (GE) 8x8 fuel (which is the current AOR for FHA radiological consequences). The assessment approach used by the licensee effectively increases the inventory release for the FHA by almost 8 percent relative to the actual available inventory for the GNF2 with PLRs, which is more than sufficient to bound any increase in the total inventory needed to account for the few PLRs that exceed an exposure of 62,000 MWd/MTU.

The discussion in paragraphs 4 and 5 of Section 3.2 of this safety evaluation (SE) also applies to an FHA, coupled with the FHA specific activity evaluation discussed in the prior paragraph. The probability of increased release due to fuel fragment dispersion through a cladding breach was not explicitly considered in NUREG-2121 for the FHA. The failure mechanism is different in that the cladding would not be expected to balloon prior to failure; therefore, the ability of the fuel to undergo axial relocation is more limited. Therefore, the findings in NUREG-2121 are applicable to an FHA.

Finally, the mechanism for fuel damage during an FHA is mechanical failure due to the impact force of the fuel assembly being dropped on top of other fuel assemblies. This mechanism is not strongly affected by the rod internal pressure as long as it remains within the mechanical design limits for the GNF2 fuel assembly design. Therefore, the small potential increases in internal rod pressure expected for the proposed rod average burnups on the PLRs would have no impact on the probability of fuel rod failure due to an FHA. The licensee continues to be responsible for ensuring that the mechanical design limits for the GNF2 fuel assembly design are met.

The staff finds that the licensee has demonstrated that: (1) the release fractions from Table 3 of RG 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors" are acceptable for use, given the minor burnup increment above the limit established in RG 1.183 for applicability and the conservative evaluation of the impact to the activity available for release during an FHA; and (2) the total available inventory for release from an FHA involving GNF2 fuel is bounded by an FHA involving GE 8x8 fuel. Therefore, the proposed movement of fuel from LGS, Unit 2, Cycle 14, with PLRs exceeding a peak rod burnup limit of 62,000 MWd/MTU, as described in the LAR, is acceptable with respect to the postulated radiological consequences from an FHA.

3.5 Control Rod Drop Accident Radiological Consequences

The LAR submittal included a discussion of the impact to the radiological consequences due to a CRDA. The licensee indicated that the GNF2 evaluation in the AOR for the CRDA already assumes that all fuel rods in the assembly are full length fuel rods when determining the total activity of the fuel assembly. A review of the LGS UFSAR indicates that the licensee performs its analysis consistent with GESTAR II. If necessary, a licensee will perform a CRDA analysis to determine the number of fuel rods that reach applicable enthalpy thresholds to assume failure. The LGS design-basis CRDA radiological consequences AOR uses a bounding estimate of 1,200 failed rods, and any cycle-specific assessments must confirm that this estimate remains bounding. The GESTAR II CRDA analysis methodology does not distinguish between PLRs and FLRs, so all failed rods are essentially treated as FLRs.

As a result of the approach used by the licensee in its design basis for analysis of the radiological consequences due to a CRDA, the potential increase in activity due to the increased burnup of the PLRs can be justified using a similar discussion to that in paragraph 1 of Section 3.4 of this SE. Similarly, the impact of release of fission gases from the fuel matrix due to fuel pellet geometry changes and the potential for fuel fragment dispersion through a cladding breach are addressed, using a similar discussion to paragraphs 3 through 5 of Section 3.2 of this SE.

Finally, the criteria for determining the number of fuel rod failures due to a CRDA event are defined as part of the application of the analysis methodology for the CRDA event, rather than as part of the dose consequences analysis. Therefore, any rod mechanical impacts, including

the rod internal pressure, would be addressed in the CRDA analysis to determine the estimated number of fuel rod failures to compare to the assumed 1,200 fuel rod failures in the CRDA radiological consequences AOR.

The staff finds that the licensee has demonstrated that: (1) the release fractions from Table 3 of RG 1.183 are acceptable for use given the minor burnup increment above the limit established in RG 1.183 for applicability and the conservative evaluation of the impact to the activity available for release during a CRDA; and (2) the total available inventory for release from a CRDA involving GNF2 fuel is bounded by the current LGS CRDA radiological consequences AOR. Therefore, the proposed operation of LGS, Unit 2, Cycle 14, with PLRs exceeding a peak rod burnup limit of 62,000 MWd/MTU, as described in the LAR, is acceptable with respect to the postulated radiological consequences from a CRDA.

3.6 NRC Staff Conclusion

The licensee provided an evaluation to demonstrate the acceptability of allowing PLRs to exceed the 62,000 MWd/MTU burnup limit provided in RG 1.183 for use of the data in Tables 1 and 3. The licensee committed to RG 1.183 as part of its AST implementation. Based on the evaluation provided in Sections 3.2 through 3.5 of this SE, the NRC staff finds that the licensee has demonstrated that its current radiological AOR for the LOCA, MSLB, FHA, and CRDA events bound the potential radiological consequences resulting from the proposed increase in the average rod burnup for PLRs. Therefore, the current radiological AOR for LGS continue to demonstrate that the requirements of 10 CFR 50.67 are met.

The demonstration is limited to GNF2 fuel for the FHA, and LGS, Unit 2, Cycle 14, for the LOCA, MSLB, and CRDA. Since the proposed amendment is only to GNF2 fuel expected to exceed the 62,000 MWd/MTU limit in the current operating cycle, the NRC staff did not perform a generic evaluation for any other situations in which PLRs may exceed the RG 1.183 burnup limit.

Therefore, approval of this license amendment will allow the use of the release fractions listed in Tables 1 and 3 of RG 1.183 for partial length rods (PLRs) that are currently in the LGS, Unit 2, Cycle 14, reactor core for the remainder of the current operating cycle. These PLRs are expected to exceed 62,000 MWd/MTU (which is the current rod peak burnup limit specified in footnotes 10 and 11 of RG 1.183) prior to the end of the operating cycle. In addition, the proposed change revised the LGS licensing basis to allow movement of irradiated fuel bundles containing PLRs that have been in operation above the 62,000 MWd/MTU limit. Therefore, the NRC staff concludes that for a limited number of PLRs that are currently in the LGS, Unit 2, Cycle 14, reactor core for the remainder of the current operating cycle and subsequent fuel movements is acceptable.

4.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION

The NRC's regulation in 10 CFR 50.92(c) states that the NRC may make a final determination, under the procedures in 10 CFR 50.91, 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 from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

An evaluation of the issue of no significant hazards consideration provided by the licensee 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 proposed change would allow the use of the release fractions listed in Tables 1 and 3 of RG 1.183 for partial length rods, which are currently in the LGS, Unit 2, Cycle 14, reactor core that are expected to exceed the 62,000 MWd/MTU rod peak burnup limit specified in footnotes 10 and 11 of RG 1.183 prior to the end of the operating cycle. In addition, the proposed change would revise the LGS licensing basis to allow movement of irradiated fuel bundles containing partial length rods that have been in operation above the 62,000 MWd/MTU limit. The proposed change does not involve any physical changes to the plant design and is not an initiator of an accident. The proposed change does not adversely affect accident initiators or precursors, and does not alter the design assumptions, conditions, or configuration of the plant or the manner in which the plant is operated or maintained. Therefore, the proposed change does not affect the probability of a LOCA. In addition, the proposed change does not affect the probability of a fuel handling accident or control rod drop accident because the method and frequency of initiating activities are not changing.

   Analyses have been performed that demonstrate that the power and burnup or a partial length rod is within 2.4 percent of the power and burnup in the same axial portion of neighboring full length rods, which is minor. Therefore, since the power and burnup of the full length rods comply with the limits specified in footnotes 10 and 11 of RG 1.183, the partial length rods may operate beyond the 62,000 MWd/MTU burnup limit and meet the intent of RG 1.183. There are no changes in the dose consequences of the analyses of record for the fuel handling accident, control rod drop accident, and LOCA.

   Therefore, the proposed 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 proposed change would allow the use of the release fractions listed in Tables 1 and 3 of RG 1.183 for partial length rods, which are currently in the LGS, Unit 2, Cycle 14, reactor core that are expected to exceed the 62,000 MWd/MTU rod peak burnup limit specified in footnotes 10 and 11 of RG 1.183 prior to the end of the operating cycle. In addition, the proposed change would revise the LGS licensing basis to allow movement of irradiated fuel bundles containing partial length rods that have been in

operation above the 62,000 MWd/MTU limit. The proposed change does not introduce any changes or mechanisms that create the possibility of a new or different kind of accident. The proposed change does not install any new or different type of equipment, and installed equipment is not being operated in a new or different manner. No new effects on existing equipment are created nor are any new malfunctions introduced.

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 safety?

Response: No.

The proposed change would allow the use of the release fractions listed in Tables 1 and 3 of RG 1.183 for partial length rods, which are currently in the LGS, Unit 2, Cycle 14, reactor core that are expected to exceed the 62,000 MWd/MTU rod peak burnup limit specified in footnotes 10 and 11 of RG 1.183 prior to the end of the operating cycle. In addition, the proposed change would revise the LGS licensing basis to allow movement of irradiated fuel bundles containing partial length rods that have been in operation above the 62,000 MWd/MTU limit. Analyses have been performed that demonstrate that the power and burnup for a partial length rod is within 2.4 percent of the power and burnup in the same axial portion of neighboring full length rods, which is minor. There is no change in the dose consequences of the fuel handling accident, control rod drop accident, or loss-of-coolant accident analyses of record. The margin of safety, as defined by 10 CFR 50.67 and RG 1.183, has been maintained.

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

Based on the above evaluation, the NRC staff concludes that the three standards of 10 CFR 50.92(c) are satisfied. Therefore, the NRC staff has made a final determination that no significant hazards consideration is involved for the proposed amendment and that the amendment should be issued as allowed by the criteria contained in 10 CFR 50.91.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendment on February 13, 2017. The State official had no comments.

6.0 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 previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (82 FR 8871). 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.

7.0 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) there is reasonable assurance that 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.

8.0 REFERENCES

1. Exelon Generation letter from David P. Helker, Manager, Licensing & Regulatory Affairs, to NRC Document Control Desk Re: "License Amendment Request – Proposed Change Regarding Partial Length Fuel Rod (PLR) Burnup," December 20, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16355A263).

2. NRC Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," July 2000 (ADAMS Accession No. ML003716792).

3. NUREG-0800, "Standard Review Plan," Section 15.0.1, Rev. 0, "Radiological Consequence Analyses Using Alternative Source Terms," July 2000 (ADAMS Accession No. ML003734190).

4. U.S. Atomic Energy Commission (now NRC) Technical Information Document 14844, "Calculation of Distance Factors for Power and Test Reactors," March 23, 1962 (non-public).

5. NUREG/CR-6703, "Environmental Effects of Extending Fuel Burnup Above 60 GWd/MTU," published January 2001 (ADAMS Accession No. ML010310298).

6. NUREG-2121, "Fuel Fragmentation, Relocation, and Dispersal During the Loss-of-Coolant Accident," March 2012 (ADAMS Accession No. ML12090A018).

Principal Contributors: SKrepel
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JParillo

Date: March 15, 2017

SUBJECT: LIMERICK GENERATING STATION, UNIT 2 – ISSUANCE OF AMENDMENT RE: PARTIAL LENGTH FUEL ROD BURNUP (CAC NO. MF8958) DATED MARCH 15, 2017

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ADAMS Accession Number: ML17047A353 *by memorandum dated

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