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

June 23, 2017

Mr. Bryan C. Hanson
Senior Vice President
Exelon Generation Company, LLC
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: THREE MILE ISLAND NUCLEAR STATION, UNITS 1 AND 2 – ISSUANCE OF AMENDMENT RE: CHANGES TO THE EMERGENCY PLAN RELATED TO STAFFING (CAC NO. MF8147)

Dear Mr. Hanson:

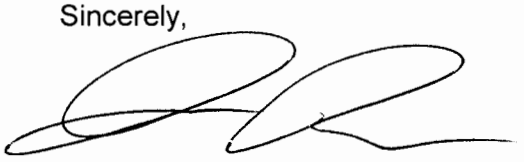
The U.S. Nuclear Regulatory Commission (Commission) has issued the enclosed Amendment No. 291 to Renewed Facility Operating License No. DPR-50 for the Three Mile Island Nuclear Station, Unit 1, in response to your application dated July 15, 2016, as supplemented by letter dated February 13, 2017.

The amendment approves changes to the emergency plan that involve on-shift emergency response staffing modifications.

In accordance with the Possession-Only License No. DPR-73 Post-Defueling Monitored Storage Safety Analysis Report for the Three Mile Island Nuclear Station, Unit 2, the emergency plan for Unit 1 is considered to encompass Unit 2. Therefore, an amendment to the Unit 2 license is not required.

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,



Justin C. Poole, Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-289 and 50-320

Enclosures:
1. Amendment No. 291 to DPR-50
2. Safety Evaluation

cc: Listserv

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-289

THREE MILE ISLAND NUCLEAR STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 291
Renewed License No. DPR-50

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

   A. The application for amendment by Exelon Generation Company, LLC (the licensee), dated July 15, 2016, as supplemented by letter dated February 13, 2017, 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. 291, the license is amended by changes to the Emergency Plan as set forth in the licensee's application dated July 15, 2016, as supplemented by letter dated February 13, 2017, and evaluated in the NRC staff's safety evaluation for this amendment.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Michele G Evans for

William M. Dean, Director
Office of Nuclear Reactor Regulation

Date of Issuance: June 23, 2017

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 291 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-50

EXELON GENERATION COMPANY, LLC

THREE MILE ISLAND NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOS. 50-289 AND 50-320

1.0 INTRODUCTION

By application dated July 15, 2016 (Reference 1), as supplemented by letter dated February 13, 2017 (Reference 2), Exelon Generation Company, LLC (the licensee) submitted proposed changes to the Three Mile Island Nuclear Station (TMI) Site Emergency Plan (TMISEP) for U.S. Nuclear Regulatory Commission (NRC or the Commission) prior review and approval pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.54(q)(4) for TMI, Units 1 and 2.

The proposed changes would decrease the on-shift radiation protection technician staffing from three to two technicians. The amendment would also change staffing of on-shift maintenance personnel. Specifically, the amendment would (1) revise the on-shift position of Operations Support Center Director (renamed Repair Team Lead) to remove the requirement that the position be from the Maintenance organization, (2) remove two dedicated maintenance technicians from the on-shift staffing total, and (3) remove two additional personnel from the Repair and Corrective Actions Major Task and assign them to respond within 60 minutes, as well as one additional personnel to respond within 90 minutes.

The license amendment request was originally noticed in the *Federal Register* on October 25, 2016 (81 FR 73435). The supplement dated February 13, 2017, expanded the scope of the application as originally noticed; therefore, the NRC staff renoticed the application in the *Federal Register* on April 11, 2017 (82 FR 17458).

2.0 REGULATORY EVALUATION

The regulatory requirements and guidance applicable to this safety evaluation are as follows.

2.1 Regulatory Requirements

Section 50.47, "Emergency plans," of 10 CFR sets forth emergency plan requirements for nuclear power plant facilities. The regulations in 10 CFR 50.47(a)(1)(i) state, in part, that "no initial operating license for a nuclear power reactor will be issued unless a finding is made by the NRC that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency."

As described in 10 CFR 50.47(a)(2), the NRC staff will base its finding, in part, on an assessment as to whether the applicant's onsite emergency plans are adequate and whether there is reasonable assurance that they can be implemented.

Section 50.47(b) of 10 CFR establishes the standards that the onsite and offsite emergency response plans must meet for NRC staff to make a positive finding that there is reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency. With respect to shift staffing and emergency plans, augmentation is addressed in:

- 10 CFR 50.47(b)(1), which states, in part, that "each principal response organization has staff to respond and to augment its initial response on a continuous basis," and

- 10 CFR 50.47(b)(2), which states, in part, that "adequate staffing to provide initial facility accident response in key functional areas is maintained at all times," and that "timely augmentation of response capabilities is available...."

Section IV, Part A, "Organization," of Appendix E to 10 CFR Part 50, "Emergency Planning and Preparedness for Production and Utilization Facilities," states, in part, that:

> The organization for coping with radiological emergencies shall be described, including definition of authorities, responsibilities, and duties of individuals assigned to the licensee's emergency organization....

The proposed changes to the licensee's emergency plan were submitted to the NRC by the licensee for technical and regulatory review and approval prior to implementation, as required under 10 CFR 50.54(q)(4).

2.2 Guidance

Regulatory Guide (RG) 1.101, Revision 2, "Emergency Planning and Preparedness for Nuclear Power Reactors" (Reference 3), provides guidance on methods acceptable to the NRC staff for complying with specific parts of the NRC's regulations – in this case, 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. RG 1.101 endorses Revision 1 to NUREG-0654/FEMA-REP-1 (NUREG-0654), "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (Reference 4), which provides specific acceptance criteria for complying with the standards set forth in 10 CFR 50.47. These criteria provide a basis for NRC licensees and State and local governments to develop and maintain acceptable radiological emergency response plans and preparedness.

RG 1.219, "Guidance on Making Changes to Emergency Plans for Nuclear Power Reactors" (Reference 5), provides guidance on methods acceptable to the NRC staff for implementation of 10 CFR 50.54(q) as they relate to making changes to emergency response plans.

In Section II, "Planning Standards and Evaluation Criteria," to NUREG-0654, Evaluation Criteria II.B.1 and II.B.5 address planning standard 10 CFR 50.47(b)(2).

- Evaluation Criteria II.B.1 states that each licensee shall specify the onsite emergency organization of plant staff personnel for all shifts and its relation to the responsibilities and duties of the normal shift complement.

- Evaluation Criteria II.B.5, states, in part, that:

> Each licensee shall specify the positions or title and major tasks to be performed by the persons to be assigned to the functional areas of emergency activity. For emergency situations, specific assignments shall be made for all shifts and for plant staff members, both onsite and away from the site. These assignments shall cover the emergency functions in Table B-1 entitled, "Minimum Staffing Requirements for Nuclear Power Plant Emergencies." The minimum on-shift staffing levels shall be as indicated in Table B-1. The licensee must be able to augment on-shift capabilities within a short period after declaration of an emergency. This capability shall be as indicated in Table B-1.

3.0 TECHNICAL EVALUATION

The NRC staff has reviewed the licensee's regulatory and technical analyses in support of its proposed TMISEP changes, as described in the application dated July 15, 2016, and as supplemented by letter dated February 13, 2017. The NRC staff's technical evaluation is summarized below.

3.1 On-Shift Radiation Protection Technicians (RPTs)

The licensee proposed a change to reduce the on-shift staffing level for RPTs from three to two. The technical justification for this proposed change addressed the following major tasks assigned to this position:

> Off-Site Dose Assessment: Improvements in the dose assessment process have minimized the time necessary to complete this task, thus providing the on-shift RPTs more available time to support other possible RPT tasks. This major task has not been changed; however, this increase in efficiency and the resultant increase in the availability of the on-shift RPTs supports the reduction in overall on-shift RPT staffing levels.
>
> In-Plant Surveys: The licensee determined that one RPT for this major task is sufficient, as there are no projected tasks associated with in-plant surveys during the initial stages of the event that cannot be accomplished by one RPT. The use of an electronic access control system (EACS) also supports this reduction. The NRC staff determined that reducing the staffing level for this major task was acceptable. Moreover, if needed, there is an additional RPT available that can support an event with significantly changing and/or unknown in-plant radiological conditions where in-plant access by site personnel would be needed to mitigate the consequences of the event.
>
> Protective Actions (In-Plant): The licensee does not propose any changes to this major task, but notes that improvements in technology and tools have reduced the time needed to support this major task, thus increasing the availability of the two on-shift RPTs to support other tasks as needed.
>
> Access Control: The use of EACS does not require the constant support of an on-shift RPT. Even during an event where the dose and dose rate setpoints must be changed based upon accident range radiation conditions, the licensee has determined that it would only take approximately 3 minutes to revise the EACS setpoints. If dose rates are unknown, then the on-shift RPT staff can provide continuous support. It was noted in the

NRC staff's review that Operations personnel are not qualified to perform self-monitoring in High Radiation Areas or Locked High Radiation Areas. The NRC staff determined that the use of EACS is acceptable, as the licensee has a process where the dose and dose rate setpoints can be revised to support accident conditions in a timely fashion, as well as having a process where RPT support for operations and/or repair team activities can be assured for high radiation areas.

RPT Coverage for Repair, Corrective Actions, Search and Rescue, First-Aid, and Firefighting: The licensee assigns one RPT to support the fire brigade under the direction of the Shift Emergency Director (SED); however, this is a support role and is not considered part of the actual fire brigade. This allows for significant flexibility when the SED is determining the priorities for events that include fires and fires with possible radiological impact (i.e., some events may not need an RPT to support the fire brigade). If necessary, the SED can direct the on-shift RPT to support the fire brigade. Search and Rescue and First-Aid are collateral duties supported by RPTs, Security staff, and Operations staff, as determined by the SED. The NRC staff has determined that this is an acceptable way of supporting these functions. Maintaining on-shift flexibility to support multiple event-types under the direction of the SED is acceptable, as long as an RPT is available to support accident range radiation conditions during radiological events.

Personnel Monitoring: The use of electronic dosimeters and dosimeters of legal record (DLR), which are required of all site staff and do not require RPT support, reduce the burden on the on-shift RPTs. As stated earlier, even a revision to the dose and dose rate setpoints based upon evolving accident range radiological conditions can be performed in approximately 3 minutes by an RPT. In addition, the site staff is trained on how to use the automated whole body monitors and, if necessary, the portable hand friskers to self-monitor for contamination. The NRC staff has determined that this function can readily be assigned, if necessary, to the on-shift RPTs as proposed.

Dosimetry: As described earlier, the licensee utilizes an EACS system and self-issued DLRs. If additional dosimetry, or DLRs, are necessary, this can be accomplished by any RPT and not necessarily a fully qualified (American National Standards Institute) RPT. The NRC staff determined that the need for additional electronic dosimeters and DLRs to be available would occur after the Operations Support Center (OSC) has been staffed, which at this time could be readily accomplished by the OSC staff if necessary.

3.2 On-Shift Maintenance

The licensee proposed several changes related to the on-shift maintenance function, as well as related changes to the licensee's emergency response organization (ERO) related to maintenance personnel arriving to augment the emergency response.

On-Shift OSC Director: The licensee proposed to rename this position the "Repair Team Lead" and to revise the requirements for this position to allow personnel, other than those from the maintenance organization, to be available to staff this position. It will remain on-shift to support any maintenance activities under the direction of the SED. The NRC staff has determined that this is an acceptable approach as the need for immediate maintenance support is reduced by TMI having diverse and redundant safety systems, such that maintenance support from the ERO within 60 minutes is sufficient. Having a Repair Team Lead assigned on-shift provides the licensee the opportunity to effectively develop repair team strategies and plans prior to the ERO responding, without having to

add this task on the SED, thus allowing the SED to provide effective oversight of the entire event and develop on-shift staff priorities. The primary responsibility of this position is oversight and supervision; thus, it is not critical that this position come from maintenance staff.

Attachments 2 and 3 to the license amendment request have the markup and clean copies, respectively, of the proposed pages of the TMISEP. The NRC staff identified in its review that the clean copy of Table TMI 2-1, "Minimum Staffing Requirements for TMI Station," is inconsistent with the marked-up copy of Table TMI 2-1, as the title of "OSC Director" was not changed to "Repair Team Lead." The NRC staff considers this a typographical error and finds the use of the title "Repair Team Lead" to be acceptable.

Maintenance Technicians: The licensee proposed to eliminate the on-shift mechanical and electrical maintenance technicians. In addition, the licensee proposed to eliminate the additional on-shift mechanical and electrical maintenance functions, which could be a collateral duty with plant operators or other on-shift staff as assigned and as trained. The combination of these proposed changes would eliminate the operational policy of maintaining a minimum maintenance crew on-shift to support emergency plan implementation. In response to this proposed elimination of on-shift staff/functions, the licensee proposed to add one mechanical and one electrical maintenance technician to the ERO to respond within 60 minutes of an Alert classification, and to add one instrumentation and control technician to the ERO to respond within 90 minutes of an Alert classification.

The NRC staff has determined that this proposed change is an acceptable approach in meeting the intent of the guidance and maintaining compliance with applicable regulations. The need for on-shift maintenance expertise in support of the TMISEP is mitigated by the redundancy and diversity of the TMI emergency core cooling systems (ECCS) design. As such, it is acceptable to conclude that the need for ECCS maintenance support within the first 60 minutes of an event is negligible, and that having mechanical and electrical maintenance technicians respond within 60 minutes and an instrumentation and control technician respond within 90 minutes of an Alert declaration is an acceptable approach. Additionally, the licensee will maintain limited maintenance capability on-shift by having one mechanical and one electrical maintenance technician on-shift as a collateral duty to support limited ECCS maintenance tasks.

3.3 Summary

The NRC staff performed a technical and regulatory review of the licensee's proposed changes to the following Major Functional Areas and Tasks:

- In-Plant Surveys
- Protective Actions (In–Plant)
  - Access Control
  - RPT Coverage for Repair, Corrective Actions, Search and Rescue, First-Aid, and Firefighting
  - Personnel Monitoring
  - Dosimetry
- Plant System Engineering, Repair, and Corrective Actions
  - Repair and Corrective Actions

The NRC staff determined that these changes do not alter the intent of any major functional area or task.

The NRC staff reviewed the remaining major functional areas and tasks and determined that, with the proposed changes, there is reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency.

Based on the above, the NRC staff has determined that the proposed changes meet the guidance in NUREG-0654, the standards of 10 CFR 50.47(b)(4), and the requirements in Appendix E to 10 CFR Part 50. Therefore, pursuant to 10 CFR 50.54(q)(4), the NRC staff concludes that the proposed TMISEP changes, provided as Attachment 3 to the licensee's supplemental letter dated February 13, 2017, are acceptable.

3.4 Conclusion

The NRC staff concludes that the proposed emergency plan changes meet the standards in 10 CFR 50.47(b) and the requirements in Appendix E to 10 CFR Part 50, and provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the official from the Commonwealth of Pennsylvania was notified of the proposed issuance of the amendment on May 25, 2017. The official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an environmental assessment and finding of no significant impact regarding this license amendment was published in the *Federal Register* on June 22, 2016 (82 FR 28538). Accordingly, based upon the environmental assessment, the Commission has determined that issuance of this amendment will not have a significant effect on the quality of the human environment.

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) 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.

7.0 REFERENCES

1. Exelon Generation Company, LLC, "License Amendment Request for Approval of Changes to the Three Mile Island Nuclear Station Emergency Plan Related to Staffing," July 15, 2016 (ADAMS Accession No. ML16201A146).

2. Exelon Generation Company, LLC, "Response to Request for Additional Information, License Amendment Request for Approval of Changes to the Three Mile Island Nuclear

Station Emergency Plan Related to Staffing," February 13, 2017 (ADAMS Accession No. ML17045A036).

3. Regulatory Guide 1.101, Revision 2, "Emergency Planning and Preparedness for Nuclear Power Reactors," October 1981 (ADAMS Accession No. ML090440294).

4. NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980 (ADAMS Accession No. ML040420012).

5. Regulatory Guide 1.219, "Guidance on Making Changes to Emergency Plans for Nuclear Power Reactors," November 2011 (ADAMS Accession No. ML102510626).

Principal Contributor: D. Johnson, NSIR

Date: June 23, 2017

SUBJECT: THREE MILE ISLAND NUCLEAR STATION, UNITS 1 AND 2 – ISSUANCE OF AMENDMENT RE: CHANGES TO THE EMERGENCY PLAN RELATED TO STAFFING (CAC NO. MF8147) DATED JUNE 23, 2017

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