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

February 28, 2018

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: LIMERICK GENERATING STATION, UNITS 1 AND 2 – ISSUANCE OF AMENDMENT NOS. 228 AND 191 REVISING TECHNICAL SPECIFICATIONS TO RELOCATE MAIN CONDENSER OFFGAS MONITORING INSTRUMENTATION AND GASEOUS EFFLUENTS TECHNICAL SPECIFICATIONS (CAC NOS. MF9650 AND MF9651; EPID L-2017-LLA-0214)

Dear Mr. Hanson:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment Nos. 228 and 191 to Renewed Facility Operating License Nos. NPF-39 and NPF-85 for the Limerick Generating Station, Units 1 and 2, respectively. These amendments consist of changes to the technical specifications (TSs) in response to your application dated April 24, 2017.

The amendments replace existing TS requirements associated with the main condenser offgas monitoring instrumentation and gaseous effluents. Specifically, certain requirements will be relocated from the TSs to licensee-controlled documents such that future changes could be made to these provisions pursuant to Title 10 of the *Code of Federal Regulations* Section 50.59, or by the regulatory requirements applicable to the licensee-controlled document.

A copy of our 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 Nos. 50-352 and 50-353

Enclosures:
1. Amendment No. 228 to Renewed NPF-39
2. Amendment No. 191 to Renewed NPF-85
3. Safety Evaluation

cc: Listserv

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-352

LIMERICK GENERATING STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 228
Renewed License No. NPF-39

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

   A. The application for amendment by Exelon Generation Company, LLC (Exelon Generation Company), dated April 24, 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, 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 Renewed Facility Operating License No. NPF-39 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 228, are hereby incorporated into this renewed license. Exelon Generation Company 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 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

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

Attachment:
Changes to the Facility Operating
License and Technical Specifications

Date of Issuance: February 28, 2018

ATTACHMENT TO LICENSE AMENDMENT NO. 228

LIMERICK GENERATING STATION, UNIT 1

RENEWED FACILITY OPERATING LICENSE NO. NPF-39

DOCKET NO. 50-352

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove	Insert
3	3

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	Insert
x	x
xvii	xvii
xix	xix
xxiii	xxiii
3/4 3-103	3/4 3-103
3/4 3-104	---
3/4 3-105	---
3/4 3-106	---
3/4 3-107	---
3/4 3-108	---
3/4 11-15	3/4 11-15
3/4 11-16	3/411-16
6-14e	6-14e

(2) Pursuant to the Act and 10 CFR Part 70, to receive, possess and to use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;

(3) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(4) Pursuant to the Act and 10 CFR Parts 30, 40, 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility, and to receive and possess, but not separate, such source, byproduct, and special nuclear materials as contained in the fuel assemblies and fuel channels from the Shoreham Nuclear Power Station.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I (except as exempted from compliance in Section 2.D. below) and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Exelon Generation Company is authorized to operate the facility at reactor core power levels not in excess of 3515 megawatts thermal (100% rated power) in accordance with the conditions specified herein and in Attachment 1 to this license. The items identified in Attachment 1 to this renewed license shall be completed as specified. Attachment 1 is hereby incorporated into this renewed license.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 228, are hereby incorporated into this renewed license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

SECTION PAGE

INSTRUMENTATION (Continued)

(Deleted) 3/4 3-97

The information from pages 3/4 3-98 through 3/4 3-101 has been intentionally omitted. Refer to note on page 3/4 3-98 ..... 3/4 3-98

The information from pages 3/4 3-103 through 3/4 3-108 has been intentionally omitted. Refer to note on page 3/4 3-103 ..... 3/4 3-103

3/4.3.8 (Deleted) The information on pages 3/4 3-110 and 3/4 3-111 has been intentionally omitted. Refer to note on page 3/4 3-110 ..... 3/4 3-110

3/4.3.9 FEEDWATER/MAIN TURBINE TRIP SYSTEM ACTUATION INSTRUMENTATION 3/4 3-112

Table 3.3.9-1 Feedwater/Main Turbine Trip System Actuation Instrumentation 3/4 3-113

Table 3.3.9-2 Feedwater/Main Turbine Trip System Actuation Instrumentation Setpoints 3/4 3-114

Table 4.3.9.1-1 (Deleted) 3/4 3-115

3/4.4 REACTOR COOLANT SYSTEM

3/4.4.1 RECIRCULATION SYSTEM

Recirculation Loops 3/4 4-1

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

SECTION PAGE

RADIOACTIVE EFFLUENTS (Continued)

The information from page 3/4 11-15 has been intentionally omitted. Refer to note page 3/4 11-15 ..... 3/4 11-15

Main Condenser 3/4 11-16

The information on page 3/4 11-17 has been intentionally omitted. Refer to note on this page 3/4 11-17

3/4.11.3 (Deleted) The information on pages 3/4 11-18 through 3/4 11-20 has been intentionally omitted. Refer to note on page 3/4 11-18.

3/4.11.4 (Deleted) 3/4 11-18

3/4.12 (Deleted) The information on pages 3/4 12-1 through 3/4 12-14 has been intentionally omitted. Refer to note on page 3/4 12-1 ..... 3/4 12-1

BASES

SECTION		PAGE
INSTRUMENTATION (Continued)		
	(Deleted)	B 3/4 3-5
	(Deleted)	B 3/4 3-5
	Remote Shutdown System Instrumentation and Controls	B 3/4 3-5
	Accident Monitoring Instrumentation	B 3/4 3-5
	Source Range Monitors	B 3/4 3-5
	(Deleted)	B 3/4 3-6
	Chlorine and Toxic Gas Detection Systems	B 3/4 3-6
	(Deleted)	B 3/4 3-6
	(Deleted)	B 3/4 3-7
	(Deleted)	B 3/4 3-7
	(Deleted)	B 3/4 3-7
3/4.3.8	(Deleted)	B 3/4 3-7
3/4.3.9	FEEDWATER/MAIN TURBINE TRIP SYSTEM ACTUATION INSTRUMENTATION	B 3/4 3-7
	Bases Figure B 3/4.3-1 Reactor Vessel Water Level	B 3/4 3-8
3/4.4 REACTOR COOLANT SYSTEM		
3/4.4.1	RECIRCULATION SYSTEM	B 3/4 4-1
3/4.4.2	SAFETY/RELIEF VALVES	B 3/4 4-2
3/4.4.3	REACTOR COOLANT SYSTEM LEAKAGE	
	Leakage Detection Systems	B 3/4 4-3
	Operational Leakage	B 3/4 4-3
3/4.4.4	CHEMISTRY	B 3/4 4-3

BASES

SECTION		PAGE
RADIOACTIVE EFFLUENTS (Continued)		
	(Deleted) The information from page B 3/4 11-4 has been intentionally omitted. Refer to note on page B 3/4 11-4	B 3/4 11-4
	Main Condenser	B 3/4 11-5
	(Deleted)	B 3/4 11-5
3/4.11.3	(Deleted)	B 3/4 11-5
3/4.11.4	(Deleted)	B 3/4 11-5
3/4.12	(Deleted) The information from pages B 3/4 12-1 through B 3/4 12-2 has been intentionally omitted. Refer to note on page B 3/4 12-1	B 3/4 12-1

Section 3/4.3.7.12 (Deleted)

THE INFORMATION FROM THIS TECHNICAL SPECIFICATIONS SECTION HAS BEEN RELOCATED TO THE ODCM AND THE TRM. TECHNICAL SPECIFICATIONS PAGES 3/4 3-104 THROUGH 3/4 3-108 OF THIS SECTION HAVE BEEN INTENTIONALLY OMITTED.

Section 3/4.11.2.5 (Deleted)

THE INFORMATION FROM THIS TECHNICAL
SPECIFICATIONS SECTION HAS BEEN RELOCATED
TO THE TRM.

RADIOACTIVE EFFLUENTS

MAIN CONDENSER

LIMITING CONDITION FOR OPERATION

3.11.2.6 The rate of the sum of the activities of the noble gases Kr-85m, Kr-87, Kr-88, Xe-133, Xe-135, and Xe-138 measured at the recombiner after-condenser discharge shall be limited to less than or equal to 330 millicuries/second.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2*, and 3*.

ACTION:

With the rate of the sum of the activities of the specified noble gases at the recombiner after-condenser discharge exceeding 330 millicuries/second, restore the gross radioactivity rate to within its limit within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.11.2.6.1 Relocated to the ODCM.

4.11.2.6.2 The rate of the sum of the activities of the specified noble gases from the recombiner after-condenser discharge shall be determined to be within the limits of Specification 3.11.2.6 at the following frequencies by performing an isotopic analysis of a representative sample of gases taken at the recombiner after condenser discharge:

a. In accordance with the Surveillance Frequency Control Program.

b. Within 4 hours following a noted increase of greater than 50%, after factoring out increases due to changes in THERMAL POWER level or air in-leakage, in the nominal steady-state fission gas release from the primary coolant.

c. The provisions of Specification 4.0.4 are not applicable.

*When the main condenser air ejector is in operation.

c. The program shall, as allowed by 10 CFR 50.55a, meet Subsection ISTA, "General Requirements," and Subsection ISTD, "Preservice and Inservice Examination and Testing of Dynamic Restraints (Snubbers) in Light-Water Reactor Nuclear Power Plants," in lieu of Section XI of the ASME B&PV Code ISI requirements for snubbers, or meet authorized alternatives pursuant to 10 CFR 50.55a.

d. The 120-month program updates shall be made in accordance with 10 CFR 50.55a subject to the limitations and conditions listed therein.

l. Explosive Gas Monitoring Program

This program provides controls for potentially explosive gas mixtures contained downstream of the off-gas recombiners.

The program shall include:

a. The limit for the concentration of hydrogen downstream of the offgas recombiners and a surveillance program to ensure the limit is maintained. This limit shall be appropriate to the system's design criteria (i.e., whether or not the system is designed to withstand a hydrogen explosion);

The provisions of SR 4.0.2 and SR 4.0.3 are applicable to the Explosive Gas Monitoring Program surveillance frequencies.

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. 191
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 (Exelon Generation Company), dated April 24, 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, 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 Renewed Facility Operating License No. NPF-85 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 191, are hereby incorporated into this renewed license. Exelon Generation Company 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 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

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

Attachment:
Changes to the Facility Operating
License and Technical Specifications

Date of Issuance: February 28, 2018

ATTACHMENT TO LICENSE AMENDMENT NO. 191

LIMERICK GENERATING STATION, UNIT 2

RENEWED FACILITY OPERATING LICENSE NO. NPF-85

DOCKET NO. 50-353

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove	Insert
3	3

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	Insert
x	x
xvii	xvii
xix	xix
xxiii	xxiii
3/4 3-103	3/4 3-103
3/4 3-104	---
3/4 3-105	---
3/4 3-106	---
3/4 3-107	---
3/4 3-108	---
3/4 11-15	3/4 11-15
3/4 11-16	3/411-16
6-14e	6-14e

(2) Pursuant to the Act and 10 CFR Part 70, to receive, possess and to use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;

(3) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(4) Pursuant to the Act and 10 CFR Parts 30, 40, 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility, and to receive and possess, but not separate, such source, byproduct, and special nuclear materials as contained in the fuel assemblies and fuel channels from the Shoreham Nuclear Power Station.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I (except as exempted from compliance in Section 2.D. below) and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Exelon Generation Company is authorized to operate the facility at reactor core power levels of 3515 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 191, are hereby incorporated into this renewed license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

SECTION PAGE

INSTRUMENTATION (Continued)

(Deleted) 3/4 3-97

The information from pages 3/4 3-98 through 3/4 3-101 has been intentionally omitted. Refer to note on page 3/4 3-98 ..... 3/4 3-98

The information from pages 3/4 3-103 through 3/4 3-108 has been intentionally omitted. Refer to note on page 3/4 3-103 ..... 3/4 3-103

3/4.3.8 (Deleted) The information on pages 3/4 3-110 and 3/4 3-111 has been intentionally omitted. Refer to note on page 3/4 3-110 ..... 3/4 3-110

3/4.3.9 FEEDWATER/MAIN TURBINE TRIP SYSTEM ACTUATION INSTRUMENTATION 3/4 3-112

Table 3.3.9-1 Feedwater/Main Turbine Trip System Actuation Instrumentation 3/4 3-113

Table 3.3.9-2 Feedwater/Main Turbine Trip System Actuation Instrumentation Setpoints 3/4 3-114

Table 4.3.9.1-1 (Deleted) 3/4 3-115

3/4.4 REACTOR COOLANT SYSTEM

3/4.4.1 RECIRCULATION SYSTEM

Recirculation Loops 3/4 4-1

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

SECTION PAGE

RADIOACTIVE EFFLUENTS (Continued)

The information from page 3/4 11-15 has been intentionally omitted. Refer to note on page 3/4 11-15 ..... 3/4 11-15

Main Condenser 3/4 11-16

The information on page 3/4 11-17 has been intentionally omitted. Refer to note on this page 3/4 11-17

3/4.11.3 (Deleted) The information on pages 3/4 11-18 through 3/4 11-20 has been intentionally omitted. Refer to note on page 3/4 11-18.

3/4.11.4 (Deleted) 3/4 11-18

3/4.12 (Deleted) The information on pages 3/4 12-1 through 3/4 12-14 has been intentionally omitted. Refer to note on page 3/4 12-1 ..... 3/4 12-1

BASES

SECTION		PAGE
INSTRUMENTATION (Continued)		
	(Deleted)	B 3/4 3-5
	(Deleted)	B 3/4 3-5
	Remote Shutdown System Instrumentation and Controls	B 3/4 3-5
	Accident Monitoring Instrumentation	B 3/4 3-5
	Source Range Monitors	B 3/4 3-5
	(Deleted)	B 3/4 3-6
	Chlorine and Toxic Gas Detection Systems	B 3/4 3-6
	(Deleted)	B 3/4 3-6
	(Deleted)	B 3/4 3-7
	(Deleted)	B 3/4 3-7
	(Deleted)	B 3/4 3-7
3/4.3.8	(Deleted)	B 3/4 3-7
3/4.3.9	FEEDWATER/MAIN TURBINE TRIP SYSTEM ACTUATION INSTRUMENTATION	B 3/4 3-7
	Bases Figure B 3/4.3-1 Reactor Vessel Water Level	B 3/4 3-8
3/4.4 REACTOR COOLANT SYSTEM		
3/4.4.1	RECIRCULATION SYSTEM	B 3/4 4-1
3/4.4.2	SAFETY/RELIEF VALVES	B 3/4 4-2
3/4.4.3	REACTOR COOLANT SYSTEM LEAKAGE	
	Leakage Detection Systems	B 3/4 4-3
	Operational Leakage	B 3/4 4-3
3/4.4.4	CHEMISTRY	B 3/4 4-3a

BASES

SECTION PAGE

RADIOACTIVE EFFLUENTS (Continued)

(Deleted) The information from page B 3/4 11-4 has been intentionally omitted. Refer to note on page B 3/4 11-4 ..... B 3/4 11-4

Main Condenser ..... B 3/4 11-5

(Deleted) ..... B 3/4 11-5

3/4.11.3 (Deleted) ..... B 3/4 11-5

3/4.11.4 (Deleted) ..... B 3/4 11-5

3/4.12 (Deleted) The information from pages B 3/4 12-1 through B 3/4 12-2 has been intentionally omitted. Refer to note on page B 3/4 12-1 ..... B 3/4 12-1

Section 3/4.3.7.12 (Deleted)

THE INFORMATION FROM THIS TECHNICAL SPECIFICATIONS SECTION HAS BEEN RELOCATED TO THE ODCM AND THE TRM. TECHNICAL SPECIFICATIONS PAGES 3/4 3-104 THROUGH 3/4 3-108 OF THIS SECTION HAVE BEEN INTENTIONALLY OMITTED.

Section 3/4.11.2.5 (Deleted)

THE INFORMATION FROM THIS TECHNICAL
SPECIFICATIONS SECTION HAS BEEN RELOCATED
TO THE TRM.

RADIOACTIVE EFFLUENTS

MAIN CONDENSER

LIMITING CONDITION FOR OPERATION

3.11.2.6 The rate of the sum of the activities of the noble gases Kr-85m, Kr-87, Kr-88, Xe-133, Xe-135, and Xe-138 measured at the recombiner after-condenser discharge shall be limited to less than or equal to 330 millicuries/second.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2*, and 3*.

ACTION:

With the rate of the sum of the activities of the specified noble gases at the recombiner after-condenser discharge exceeding 330 millicuries/second, restore the gross radioactivity rate to within its limit within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.11.2.6.1 Relocated to the ODCM.

4.11.2.6.2 The rate of the sum of the activities of the specified noble gases from the recombiner after-condenser discharge shall be determined to be within the limits of Specification 3.11.2.6 at the following frequencies by performing an isotopic analysis of a representative sample of gases taken at the recombiner after condenser discharge:

a. In accordance with the Surveillance Frequency Control Program.

b. Within 4 hours following a noted increase of greater than 50%, after factoring out increases due to changes in THERMAL POWER level or air in-leakage, in the nominal steady-state fission gas release from the primary coolant.

c. The provisons of Specification 4.0.4 are not applicable.

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*When the main condenser air ejector is in operation.

c. The program shall, as allowed by 10 CFR 50.55a, meet Subsection ISTA, "General Requirements," and Subsection ISTD, "Preservice and Inservice Examination and Testing of Dynamic Restraints (Snubbers) in Light-Water Reactor Nuclear Power Plants," in lieu of Section XI of the ASME B&PV Code ISI requirements for snubbers, or meet authorized alternatives pursuant to 10 CFR 50.55a.

d. The 120-month program updates shall be made in accordance with 10 CFR 50.55a subject to the limitations and conditions listed therein.

l. Explosive Gas Monitoring Program

This program provides controls for potentially explosive gas mixtures contained downstream of the off-gas recombiners.

The program shall include:

a. The limit for the concentration of hydrogen downstream of the offgas recombiners and a surveillance program to ensure the limit is maintained. This limit shall be appropriate to the system's design criteria (i.e., whether or not the system is designed to withstand a hydrogen explosion);

The provisions of SR 4.0.2 and SR 4.0.3 are applicable to the Explosive Gas Monitoring Program surveillance frequencies.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 228 TO

RENEWED FACILITY OPERATING LICENSE NO. NPR-39 AND

AMENDMENT NO. 191 TO RENEWED FACILITY OPERATING LICENSE NO. NPR-85

EXELON GENERATION COMPANY, LLC

LIMERICK GENERATING STATION, UNITS 1 AND 2

DOCKET NOS. 50-352 AND 50-353

1.0 INTRODUCTION

By application dated April 24, 2017, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17115A087), Exelon Generation Company, LLC (the licensee) submitted a license amendment request (LAR) to revise the Technical Specifications (TSs) for Limerick Generating Station (Limerick), Units 1 and 2. Specifically, the proposed changes would revise the main condenser offgas monitoring instrumentation and gaseous effluents TSs. Selected requirements will be relocated to licensee-controlled documents.

2.0 REGULATORY EVALUATION

2.1 Description

The main condenser system is designed to condense and deaerate the exhaust steam from the main turbine and provide a heat sink for the turbine bypass system. During unit operation, air and noncondensable gases are collected in the main condenser. The noncondensable gases are removed by a mechanical vacuum pump at startup and by the steam jet air ejectors during normal operation, and then exhausted to the gaseous radwaste recombination system. The offgas consists of activation gases, fission product gases, radiolytic hydrogen and oxygen, and condenser air inleakage.

Instrumentation is provided for monitoring the concentrations of potentially explosive gas mixtures and noble gases in the offgas system.

The LAR states that the primary function of the main condenser offgas radioactivity monitors is to show conformance to the discharge limits of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20, "Standards for Protection Against Radiation." The monitors are used to provide a continuous check on the release of radioactive gaseous effluents from the main condenser steam jet air ejector.

The LAR states that the nonsafety-related main condenser offgas treatment system explosive gas monitoring system hydrogen monitors provide indications to the control room of hydrogen gas concentration to confirm proper operation of gaseous radwaste catalytic hydrogen recombiner and to detect a potentially flammable/explosive hydrogen gas concentration to allow operators to take appropriate action.

The Limerick Offsite Dose Calculation Manual (ODCM) contains the program for the control of radioactive effluents and for maintaining the doses to members of the public from radioactive effluents as low as reasonably achievable. The ODCM is a licensee-controlled document. Limerick TS 6.14, "Offsite Dose Calculation Manual (ODCM)," specifies requirements for the documentation of changes to the ODCM.

The Technical Requirements Manual (TRM) is a licensee-controlled document as described in Section 13.5.3 of the Limerick Final Safety Analysis Report (FSAR). The TRM contains the technical requirements and/or supporting information (e.g., tables and component lists) that were once contained in the Limerick TSs. Future changes to the relocated requirements and supporting information are processed in accordance with Section 6.0 of the Limerick TSs and are subject to a 10 CFR 50.59 review.

2.2 Description of Changes

1. Limiting Condition for Operation (LCO) 3.3.7.12 requires that the offgas monitoring instrumentation channels shown in Table 3.3.7.12-1 be operable with alarm/trip setpoints set to ensure the limits of TS 3.11.2.5 and TS 3.11.2.6, respectively, are not exceeded. Table 3.3.7.12-1 specifies operability requirements for the main condenser offgas treatment system explosive gas monitoring system hydrogen monitor and the main condenser offgas pre-treatment radioactivity monitor noble gas activity monitor. Surveillance Requirement (SR) 4.3.7.12 requires testing be performed to demonstrate operability of the monitors as delineated in Table 4.3.7.12-1.

LCO 3.3.7.12 and SR 4.3.7.12, including Tables 3.3.7.12-1 and 4.3.7.12-1, will be deleted from the TSs. The contents will be relocated to the ODCM and TRM.

2. LCO 3.11.2.5 requires that the concentration of hydrogen in the main condenser offgas treatment system shall be limited to less than or equal to 4 percent by volume. SR 4.11.2.5 requires that the concentration of hydrogen in the main condenser offgas treatment system shall be determined to be within the limits by continuously monitoring the waste gases in the main condenser offgas treatment system with the hydrogen monitors required by TS 3.3.7.12.

LCO 3.11.2.5 and SR 4.11.2.5 will be deleted from the TSs. The contents will be relocated to the TRM.

3. SR 4.11.2.6.1 requires that the rate of the sum of the activities of noble gases at the recombiner after-condenser discharge shall be continuously monitored in accordance with Specification 3.3.7.12.

SR 4.11.2.6.1 will be deleted from the TSs and the contents relocated to the ODCM.

4. SR 4.11.2.6.2 currently requires, in part, that:

> The rate of the sum of the activities of the specified noble gases from the recombiner after-condenser discharge shall be determined to be within the limits of Specification 3.11.2.6 at the following frequencies by performing an isotopic analysis of a representative sample of gases taken at the recombiner after-condenser discharge:
>
> a. In accordance with the Surveillance Frequency Control Program.
>
> b. Within 4 hours following an increase, as indicated by the Main Condenser Off-Gas Pretreatment Radioactivity Monitor, of ...

SR 4.11.2.6.2.b will be revised to replace the phrase: "an increase, as indicated by the Main Condenser Off Gas Pretreatment Radioactivity Monitor" with the phase "a noted increase."

5. New TS, "Administrative Control Program," 6.8.4.l, "Explosive Gas Monitoring Program," will be inserted.

The new TS 6.8.4.l will state:

> This program provides controls for potentially explosive gas mixtures contained downstream of the offgas recombiners.
>
> The program shall include:
>
> a. The limit for the concentration of hydrogen downstream of the offgas recombiners and a surveillance program to ensure the limit is maintained. This limit shall be appropriate to the system's design criteria (i.e., whether or not the system is designed to withstand a hydrogen explosion);
>
> The provisions of SR 4.0.2 and SR 4.0.3 are applicable to the Explosive Gas Monitoring Program surveillance frequencies.

2.3 Applicable Regulations and Guidance Documents

The NRC staff considered the following regulations and guidance documents when reviewing this LAR.

2.3.1 Regulatory Requirements

The categories of items required to be in the TSs are provided in 10 CFR 50.36(c). As required by 10 CFR 50.36(c)(2)(i), the TSs will include LCOs, which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. Per 10 CFR 50.36(c)(2)(i), when an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met.

The regulation at 10 CFR 50.36(c)(2)(ii) states that LCOs must be established for each item meeting one of four criteria:

Criterion 1. Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

Criterion 2. A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to fission product barrier.

Criterion 3. A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Criterion 4. A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

The regulation at 10 CFR 50.36(c)(3) requires TSs to include items in the category of SRs, which are requirements relating to test, calibration, or inspection, to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met. The regulations at 10 CFR 50.36(c)(5) require TSs to include administrative controls. Administrative controls are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner. Each licensee shall submit any reports to the Commission pursuant to approved TSs as specified in 10 CFR 50.4.

Also, the regulations at 10 CFR 50.36(a)(1) state that a summary statement of the bases or reasons for such specifications, other than those covering administrative controls shall also be included in the application, but shall not become part of the TSs.

2.3.2 Commission Policy Statement

On July 22, 1993, the Commission issued the "Final Policy Statement: Technical Specifications Improvements for Nuclear Power Reactors," in the *Federal Register* (58 FR 39132). The policy statement established a set of objective criteria and guidance for determining which regulatory requirements and operating restrictions should be included in the TSs. These criteria were later codified in 10 CFR 50.36, as described above.

In the final policy statement, the Commission wrote that LCOs that do not meet any of the criteria below (referring to the criteria now codified in 10 CFR 50.36) may be proposed for removal from the TSs and relocated to licensee-controlled documents, such as the FSAR.

2.3.3 Regulatory Guidance

In Generic Letter 89-01, "Implementation of Programmatic Controls for Radiological Effluent Technical Specifications in the Administrative Controls Section of the Technical Specifications and the Relocation of Procedural Details of RETS to the Offsite Dose Calculation Manual or to the Process Control Program, the NRC staff states:

> The NRC staff has examined the contents of the Radiological Effluent Technical Specifications (RETS) in relation to the Commission's Interim Policy Statement on Technical Specification Improvements. The staff has determined that programmatic controls can be implemented in the Administrative Controls section

of the Technical Specifications (TS) to satisfy existing regulatory requirements for RETS. At the same time, the procedural details of the current TS on radioactive effluents and radiological environmental monitoring can be relocated to the Offsite Dose Calculation Manual (ODCM).

Generic Letter 89-01 provides guidance for the preparation of an LAR to implement this alternative for RETS.

The NRC staff's guidance for review of TSs is in Chapter 16, Revision 3, "Technical Specifications" (ADAMS Accession No. ML100351425) of NUREG-0800, Revision 3, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition." As described therein, as part of the regulatory standardization effort, the NRC staff has prepared Standard Technical Specifications (STS) for each of the light-water reactor nuclear designs. NUREG-1433, Revision 4, "Standard Technical Specifications, General Electric BWR [Boiling Water Reactor]/4 Plants" (ADAMS Accession No. ML12104A192) contains the STS for General Electric BWR/4 plants.

3.0 TECHNICAL EVALUATION

The regulations in 10 CFR 50.36 specify four criteria for determining if an LCO is needed for a specific item. The Commission's policy statement provides additional, supplemental information regarding the four criteria. In evaluating the proposed TS changes requested by the licensee, the staff reviewed the applicability of each of the four criteria for establishing LCOs as listed in 10 CFR 50.36 and considered the information provided in the Commission's policy statement.

Criterion 1 of 10 CFR 50.36(c)(2)(ii) requires that LCOs be established for installed instrumentation that is used to detect, and indicate in the control room, a significant, abnormal degradation of the reactor coolant pressure boundary (RCPB).

The main condenser offgas radioactivity monitors monitor the noble gas concentration in the offgas effluent. Increases in levels may provide indication of defects in the fuel cladding but are not indicative of a degradation of the RCPB.

The main condenser offgas explosive gas monitors monitor the concentration of hydrogen gas in the effluent to provide information to the operators so that they may take action to avoid a potentially flammable/explosive concentration of gases. Changes in the concentration are not indicative of a degradation of the RCPB.

The limits on hydrogen gas concentration ensure that a potentially explosive concentration is not established. Changes in explosive gas concentration are indication of a potential performance degradation of the radwaste system and are not indicative of a degradation of the RCPB.

Therefore, it is not necessary to establish an LCO for the radioactivity monitors, explosive gas monitors, or hydrogen concentration to satisfy Criterion 1.

Criterion 2 of 10 CFR 50.36(c)(2)(ii) requires that LCOs be established for a process variable, design feature, or operating restriction that is an initial condition of a design-basis accident or transient analysis that either assumes the failure of or presents a challenge to fission product barrier integrity.

The main condenser offgas radioactivity monitors provide an early indication of fuel cladding deterioration. Upon indications of increasing radioactivity levels, plant operators would investigate and take the appropriate actions. The licensee stated that this indication is not used as an assumption in any accident or transient analysis.

The explosive gas monitoring instruments provide indication of the hydrogen concentration in the main condenser offgas effluent. Increases of hydrogen gases may be indicative of a problem with the gaseous radwaste system. Plant operators would investigate and take appropriate actions. The licensee stated that the gaseous radwaste system is designed to withstand the effects of a hydrogen detonation without breach of the pressure boundary. No automatic functions are associated with these monitors. The licensee stated that this indication is not used as an assumption in any accident or transient analysis.

The staff reviewed Section 15.7.1.1 of the Limerick FSAR. Section 15.7.1.1 examines the main condenser offgas treatment system failure under severe failure mode conditions for effects on plant safety. The FSAR states that "The equipment and piping are designed to resist any hydrogen/oxygen detonation that has a reasonable probability of occurring. Consequently, a detonation is not considered as a possible failure mode." The activity in the offgas system is an initial condition of the radiological consequences evaluation of the main condenser offgas treatment system failure. The staff notes that LCO 3.11.2.6 provides the necessary controls to ensure operation within the assumed limits.

The effluent instruments and hydrogen concentration are not associated with any process variable, design feature, or operating restriction that is an initial condition of a design-basis accident or transient. Therefore, it is not necessary to establish an LCO for the radioactivity monitors, explosive gas monitors, or the hydrogen concentration to satisfy Criterion 2.

Criterion 3 of 10 CFR 50.36(c)(2)(ii) requires that LCOs be established for a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design-basis accident or transient that either assumes the failure of, or presents a challenge to, the integrity of a fission product barrier.

As stated in the Final Policy Statement on Technical Specifications, the purpose of this criterion is to capture only those structures, systems, and components that are part of the primary success path of the safety analysis (an examination of the actions required to mitigate the consequences of the design basis accident and transients). The primary success path of a safety analysis consists of the combinations and sequences of equipment needed to operate so that the plant response to the design-basis accident and the transients limits the consequences of these events to within the appropriate acceptance criteria. Also captured by this criterion are those support and actuation systems that are necessary for items in the primary success path to successfully function, but the criterion does not include backup and diverse equipment.

These instruments provide a monitoring function only. Upon indications of increasing levels of radioactive materials or explosive gas content, the plant operators would diagnose the problem and take the appropriate actions per plant procedures. The licensee stated that the affected portions of the radwaste systems are designed to withstand the effects of a hydrogen detonation without breach of the pressure boundary. There are no automatic actuations associated with these instruments.

Therefore, it is not necessary to establish an LCO for the radioactivity monitors, explosive gas monitors, or the hydrogen concentration to satisfy Criterion 3.

Criterion 4 of 10 CFR 50.36(c)(2)(ii) requires that LCOs be established for a structure, system, or component that operating experience or probabilistic safety assessment has shown to be significant to public health and safety.

The licensee stated in the LAR that a review of industry operating experience did not produce any examples in which the failure of these monitors caused a significant effect on public health and safety. The licensee further stated that these monitors are not covered by its Maintenance Rule program or in the Limerick probabilistic risk assessment. The staff considered the licensee's assessment of the applicability of Criterion 4 and agrees that Criterion 4 is not applicable.

Therefore, it is not necessary to establish an LCO for the radioactivity monitors, explosive gas monitors, or the hydrogen concentration to satisfy Criterion 4.

Based on the staff's review of the applicability of the four criteria as summarized above, and the staff's review of the arguments presented by the licensee, the staff concluded that it is not necessary to establish LCOs specifying operability requirements for the main condenser offgas treatment system explosive gas monitoring system hydrogen monitor and the main condenser offgas pre-treatment radioactivity monitor noble gas activity monitor, and these requirements may be deleted from the TSs. The licensee proposed to relocate the requirements to the ODCM and TRM. Relocation of this information to licensee-controlled documents is consistent with the Commission's Policy Statement and is acceptable.

The licensee also proposed to change SR 4.11.2.6.2.b to reflect the relocation of the radioactivity monitor instrumentation requirements. SR 4.11.2.6.2 currently requires, in part, that:

> The rate of the sum of the activities of the specified noble gases from the recombiner after-condenser discharge shall be determined to be within the limits of Specification 3.11.2.6 at the following frequencies by performing an isotopic analysis of a representative sample of gases taken at the recombiner after-condenser discharge:
>
> a. In accordance with the Surveillance Frequency Control Program.
>
> b. Within 4 hours following an increase, as indicated by the Main Condenser Off-Gas Pretreatment Radioactivity Monitor, of ...

Subpart b is being changed to delete the reference to the main condenser off-gas pretreatment radioactivity monitor. The revised requirements will require the rate to be determined to be within the limits, "Within 4 hours following a noted increase." This is a conforming change reflecting the relocation of the instrumentation requirements and is acceptable.

The licensee proposed to add a new TS program, "Explosive Gas Monitoring Program," as TS 6.8.4.l. The new program will include the limit for the concentration of hydrogen downstream of the offgas recombiners and a surveillance program to ensure the limit is maintained. The limit shall be appropriate to the system's design criteria. The provisions of SR 4.0.2 and SR 4.0.3 are applicable to the surveillance frequencies for the program. The new program will ensure the appropriate limits and SRs are developed and maintained; however, the procedural details will be contained in licensee-controlled documents, subject to the licensee's review and approval processes. The proposed program elements associated with explosive gas monitoring are

consistent with those contained in the General Electric BWR/4 STS. Therefore, the staff finds the proposed program acceptable.

The main condenser offgas radioactivity and explosive gas monitoring instruments do not satisfy any of the criteria contained in 10 CFR 50.36. The staff finds it acceptable to remove these requirements from the TSs. In accordance with the Commission's policy, the procedural details of the operability and SRs are being relocated to licensee-controlled documents. This is acceptable and consistent with the guidance provided in Generic Letter 89-01 and with the contents of NUREG-1433.

Conforming editorial changes are being made to the Limerick TSs Table of Contents. The licensee also provided an annotated copy of the TS Bases for information only.

Summary of NRC Staff Conclusions

The regulations at 10 CFR 50.36 require that TSs will include items in specified categories, including LCOs and SRs. The proposed changes relocate requirements associated with the main condenser offgas radioactivity and explosive gas monitoring instrumentation and limitations on explosive gas concentration from the TSs to licensee-controlled documents. The proposed changes also establish a new administrative program for control of explosive gas concentration. As described above in this section, the NRC staff finds that the requirements do not meet the four criteria for LCOs listed in 10 CFR 50.36, and relocation of designated requirements is acceptable. The establishment of a new administrative program is also acceptable. The revised TSs continue to satisfy the requirements of 10 CFR 50.36.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendments on January 31, 2018. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to use of a facility component located within the restricted area, as defined in 10 CFR Part 20 and change SRs. The NRC staff has determined that the amendments involve 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 amendments involve no significant hazards consideration, and there has been no public comment on such finding (July 5, 2017; 82 FR 31096). Accordingly, the amendments meet 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 amendments.

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

Principal Contributor: M Chernoff

Date: February 28, 2018

SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 – ISSUANCE OF AMENDMENT NOS. 228 AND 191 REVISING TECHNICAL SPECIFICATIONS TO RELOCATE MAIN CONDENSER OFFGAS MONITORING INSTRUMENTATION AND GASEOUS EFFLUENTS TECHNICAL SPECIFICATIONS (CAC NOS. MF9650 AND MF9651; EPID L-2017-LLA-0214) DATED FEBRUARY 28, 2018

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