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

May 11, 2009

Mr. Charles G. Pardee
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2, AND BYRON STATION, UNIT NOS. 1 AND 2 - ISSUANCE OF AMENDMENTS RE: EMERGENCY DIESEL GENERATOR START TIME SURVEILLANCE REQUIREMENTS (TAC NOS. MD9021, MD9022, MD9023, AND MD9024)

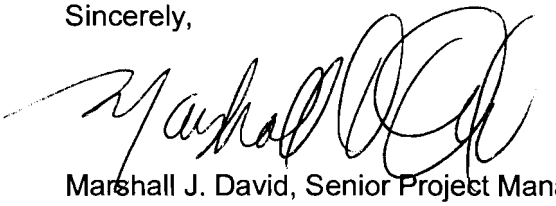
Dear Mr. Pardee:

The Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 159 to Facility Operating License No. NPF-72 and Amendment No. 159 to Facility Operating License No. NPF-77 for the Braidwood Station, Units 1 and 2 (Braidwood), and Amendment No. 164 to Facility Operating License No. NPF-37 and Amendment No. 164 to Facility Operating License No. NPF-66 for the Byron Station, Unit Nos. 1 and 2 (Byron), respectively.

The amendments are in response to your application dated June 26, 2008 (Agencywide Documents Access and Management System Accession No. ML081780567). The amendments revise Technical Specification Surveillance Requirements 3.8.1.7, 3.8.1.12, 3.8.1.15, and 3.8.1.20 for the Braidwood and Byron emergency diesel generator (EDG) start time. The current requirement is to have the EDG within voltage and frequency limits within 10 seconds after the start signal. The revised change is to have the EDG above minimum voltage and frequency within 10 seconds and verified to be within voltage and frequency limits at steady state conditions.

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

Sincerely,



Marshall J. David, Senior Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-456, STN 50-457,
STN 50-454, and STN 50-455

Enclosures:
1. Amendment No. 159 to NPF-72
2. Amendment No. 159 to NPF-77
3. Amendment No. 164 to NPF-37
4. Amendment No. 164 to NPF-66
5. Safety Evaluation

cc w/encls: Distribution via Listserv

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-456

BRAIDWOOD STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 159
License No. NPF-72

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

   A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated June 26, 2008, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-72 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 159, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

CBaldwin FOR

Russell Gibbs, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications and Facility Operating License

Date of Issuance: May 11, 2009

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-457

BRAIDWOOD STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 159
License No. NPF-77

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

   A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated June 26, 2008, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-77 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 159, and the Environmental Protection Plan contained in Appendix B, both of which are attached to License No. NPF-72, dated July 2, 1987, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

CBrodwin FOR

Russell Gibbs, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications and Facility Operating License

Date of Issuance: May 11, 2009

ATTACHMENT TO LICENSE AMENDMENT NOS. 159 AND 159

FACILITY OPERATING LICENSE NOS. NPF-72 AND NPF-77

DOCKET NOS. STN 50-456 AND STN 50-457

Replace the following pages of the Facility Operating Licenses and the Appendix A Technical Specifications (TSs) with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
License NPF-72	License NPF-72
License Page 3	License Page 3
License NPF-77	License NPF-77
License Page 3	License Page 3
TSs	TSs
3.8.1-6	3.8.1-6
3.8.1-9	3.8.1-9
3.8.1-10	3.8.1-10
3.8.1-12	3.8.1-12

(3) Exelon Generation Company, 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) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30, 40 and 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) Exelon Generation Company, 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.

C. The 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 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

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3586.6 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein and other items identified in Attachment 1 to this license. The items identified in Attachment 1 to this license shall be completed as specified. Attachment 1 is hereby incorporated into this license.

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 159, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Emergency Planning

In the event that the NRC finds that the lack of progress in completion of the procedures in the Federal Emergency Management Agency's final rule, 44 CFR Part 350, is an indication that a major substantive problem exists in achieving or maintaining an adequate state of emergency preparedness, the provisions of 10 CFR Section 50.54(s)(2) will apply.

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) Exelon Generation Company, LLC pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts are 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) Exelon Generation Company, LLC, 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.

C. The 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 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

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3586.6 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein and other items identified in Attachment 1 to this license. The items identified in Attachment 1 to this license shall be completed as specified. Attachment 1 is hereby incorporated into this license.

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 159, and the Environmental Protection Plan contained in Appendix B, both of which are attached to License No. NPF-72, dated July 2, 1987, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Emergency Planning

In the event that the NRC finds that the lack of progress in completion of the procedures in the Federal Emergency Management Agency's final rule, 44 CFR Part 350, is an indication that a major substantive problem exists in achieving or maintaining an adequate state of emergency preparedness, the provisions of 10 CFR Section 50.54(s)(2) will apply.

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.4	Verify each day tank contains ≥ 450 gal of fuel oil.	31 days
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	31 days
SR 3.8.1.6	Verify the fuel oil transfer system operates to automatically transfer fuel oil from storage tank(s) to the day tank.	31 days
SR 3.8.1.7	Verify each DG starts from normal standby condition and achieves: a. In ≤ 10 seconds, voltage ≥ 3950 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3950 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	184 days
SR 3.8.1.8	Verify manual transfer of AC power sources from the required normal qualified circuit(s) to the reserve required qualified circuit(s).	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.12	Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal each DG auto-starts from standby condition and: a. In ≤ 10 seconds achieves voltage ≥ 3950 V and frequency ≥ 58.8 Hz; b. Achieves steady state voltage ≥ 3950 V and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz; and c. Operates for ≥ 5 minutes.	18 months
SR 3.8.1.13	Verify each DG's automatic trips are bypassed on actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal except: a. Engine overspeed; and b. Generator differential current.	18 months
SR 3.8.1.14	----------NOTE---------- Momentary transients outside the load range do not invalidate this test. ---------- Verify each DG operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 5775 kW and ≤ 6050 kW; and b. For the remaining hours of the test loaded ≥ 4950 kW and ≤ 5500 kW.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.15	----------NOTES---------- 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded ≥ 4950 kW and ≤ 5500 kW or until operating temperature has stabilized. 2. Momentary transients outside of load range do not invalidate this test. ---------- Verify each DG starts and achieves: a. In ≤ 10 seconds, voltage ≥ 3950 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3950 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	18 months
SR 3.8.1.16	----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. ---------- Verify each DG: a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power; b. Transfers loads to offsite power source; and c. Returns to ready-to-load operation.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. ---------- Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal: a. De-energization of ESF buses; b. Load shedding from ESF buses; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through the safeguards sequence timers, 3. achieves steady state voltage ≥ 3950 V and ≤ 4580 V, 4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	18 months
SR 3.8.1.20	Verify when started simultaneously from standby condition, each DG achieves: a. In ≤ 10 seconds, voltage ≥ 3950 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3950 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	10 years

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-454

BYRON STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 164
License No. NPF-37

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

   A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated June 26, 2008, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-37 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No.164, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

C Gratton FOR

Russell Gibbs, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications and Facility Operating License

Date of Issuance: May 11, 2009

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-455

BYRON STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 164
License No. NPF-66

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

   A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated June 26, 2008, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-66 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A (NUREG 1113), as revised through Amendment No. 164, and the Environmental Protection Plan contained in Appendix B, both of which are attached to License No. NPF-37, dated February 14, 1985, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

C Gratton FOR

Russell Gibbs, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications and Facility Operating License

Date of Issuance: May 11, 2009

ATTACHMENT TO LICENSE AMENDMENT NOS. 164 AND 164

FACILITY OPERATING LICENSE NOS. NPF-37 AND NPF-66

DOCKET NOS. STN 50-454 AND STN 50-455

Replace the following pages of the Facility Operating Licenses and the Appendix A Technical Specifications (TSs) with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
License NPF-37	License NPF-37
License Page 3	License Page 3
License NPF-66	License NPF-66
License Page 3	License Page 3
TSs	TSs
3.8.1-6	3.8.1-6
3.8.1-9	3.8.1-9
3.8.1-10	3.8.1-10
3.8.1-12	3.8.1-12

(4) Pursuant to the Act and 10 CFR Parts 30, 40 and 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.

C. The 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 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

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3586.6 megawatts thermal (100 percent power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No.164, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Deleted.

(4) Deleted.

(5) Deleted.

(6) The licensee shall implement and maintain in effect all provisions of the approved fire protection program as described in the licensee's Fire Protection Report, and as approved in the SER dated February 1987 through Supplement No. 8, subject to the following provision:

The licensee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

(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 and 70, to receive, possess, and use in amounts are 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.

C. The license shall be deemed to contain and is subject to the conditions specified in the Commission's regulation set forth in 10 CFR Chapter I 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

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3586.6 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A (NUREG 1113), as revised through Amendment No. 164, and the Environmental Protection Plan contained in Appendix B, both of which are attached to License No. NPF-37, dated February 14, 1985, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Deleted.

(4) Deleted.

(5) Deleted.

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.4	Verify each day tank contains ≥ 450 gal of fuel oil.	31 days
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	31 days
SR 3.8.1.6	Verify the fuel oil transfer system operates to automatically transfer fuel oil from storage tank(s) to the day tank.	31 days
SR 3.8.1.7	Verify each DG starts from normal standby condition and achieves: a. In ≤ 10 seconds, voltage ≥ 3950 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3950 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	184 days
SR 3.8.1.8	Verify manual transfer of AC power sources from the required normal qualified circuit(s) to the reserve required qualified circuit(s).	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.12	Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal each DG auto-starts from standby condition and: a. In ≤ 10 seconds achieves voltage ≥ 3950 V and frequency ≥ 58.8 Hz; b. Achieves steady state voltage ≥ 3950 V and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz; and c. Operates for ≥ 5 minutes.	18 months
SR 3.8.1.13	Verify each DG's automatic trips are bypassed on actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal except: a. Engine overspeed; and b. Generator differential current.	18 months
SR 3.8.1.14	----------NOTE---------- Momentary transients outside the load range do not invalidate this test. ---------- Verify each DG operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 5775 kW and ≤ 6050 kW; and b. For the remaining hours of the test loaded ≥ 4950 kW and ≤ 5500 kW.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.15	----------NOTES---------- 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded ≥ 4950 kW and ≤ 5500 kW or until operating temperature has stabilized. 2. Momentary transients outside of load range do not invalidate this test. ---------- Verify each DG starts and achieves: a. In ≤ 10 seconds, voltage ≥ 3950 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3950 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	18 months
SR 3.8.1.16	----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. ---------- Verify each DG: a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power; b. Transfers loads to offsite power source; and c. Returns to ready-to-load operation.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. ---------- Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal: a. De-energization of ESF buses; b. Load shedding from ESF buses; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through the safeguards sequence timers, 3. achieves steady state voltage ≥ 3950 V and ≤ 4580 V, 4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	18 months
SR 3.8.1.20	Verify when started simultaneously from standby condition, each DG achieves: a. In ≤ 10 seconds, voltage ≥ 3950 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3950 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	10 years

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 159 TO FACILITY OPERATING LICENSE NO. NPF-72, AMENDMENT NO. 159 TO FACILITY OPERATING LICENSE NO. NPF-77, AMENDMENT NO. 164 TO FACILITY OPERATING LICENSE NO. NPF-37, AND AMENDMENT NO. 164 TO FACILITY OPERATING LICENSE NO. NPF-66

EXELON GENERATION COMPANY, LLC

BRAIDWOOD STATION, UNITS 1 AND 2

BYRON STATION, UNIT NOS. 1 AND 2

DOCKET NOS. STN 50-456, STN 50-457, STN 50-454, AND STN 50-455

1.0 INTRODUCTION

By letter to the Nuclear Regulatory Commission (NRC, the Commission) dated June 26, 2008 (Agencywide Documents Access and Management System Accession Number ML081780567), Exelon Generation Company, LLC (EGC, the licensee) submitted a license amendment request (LAR) for Braidwood Station, Units 1 and 2 (Braidwood), and Byron Station, Unit Nos. 1 and 2 (Byron). The LAR proposed to revise Technical Specification (TS) Surveillance Requirements (SRs) 3.8.1.7, 3.8.1.12, 3.8.1.15, and 3.8.1.20 for the emergency diesel generator (EDG) start time for Braidwood and Byron. The current requirement is to have the EDG within voltage and frequency limits within 10 seconds after the start signal. The proposed change is to have the EDG above minimum voltage and frequency within 10 seconds and verified to be within voltage and frequency limits at steady state conditions.

2.0 BACKGROUND

In the LAR, the licensee stated that the proposed changes are consistent with Revision 2 of NRC-approved Technical Specification Task Force (TSTF) Standard TS Change Traveler, TSTF-163, "Minimum vs. Steady State Voltage and Frequency."

The specific changes in these amendments are as follows.

SR 3.8.1.7 is changed (see italics) to read:

"Verify each DG starts from normal standby condition and achieves:

a. *In ≤10 seconds, voltage ≥3950 V and frequency ≥58.8 Hz* [hertz]*; and*
b. *Steady state voltage ≥3950 V and ≤4580 V, and frequency ≥58.8 Hz and ≤61.2 Hz."*

SR 3.8.1.12 is changed (see italics) to read:

"Verify on an actual or simulated Engineered Safety Feature actuation signal each DG auto-starts from standby condition and:

a. In ≤ 10 seconds achieves voltage ≥ 3950 V and *frequency ≥ 58.8 Hz*;
b. *Achieves steady state voltage ≥ 3950 V and ≤ 4580 V and* frequency ≥ 58.8 Hz and ≤ 61.2 Hz; and
c. Operates for > 5 minutes."

SR 3.8.1.15 is changed (see italics) to read:

"Verify each DG starts and achieves:

a. In ≤ 10 seconds, voltage ≥ 3950 V and frequency ≥ 58 .8 Hz; and
b. *Steady state voltage ≥ 3950 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.*"

SR 3.8.1.20 is changed (see italics) to read:

"Verify when started simultaneously from standby condition, each DG achieves:

a. In ≤ 10 seconds, voltage ≥ 3950 V and frequency ≥ 58.8 Hz; and
b. *Steady state voltage ≥ 3950 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.*"

3.0 REGULATORY EVALUATION

The regulatory requirements and guidance, which the NRC staff applied in its review of the LAR, are the following.

General Design Criterion (GDC) 17, Electric power systems, of Appendix A, General Design Criteria for Nuclear Power Plants, to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Domestic Licensing of Production and Utilization Facilities, requires that an onsite electric power system and an offsite electric power system be provided to permit functioning of structures, systems, and components important to safety. GDC 17 further requires the onsite system to have sufficient independence, redundancy, and testability, to perform its safety function, assuming a single failure. The offsite power system is required to supply electric power with two physically independent circuits that are designed and located so as to minimize, to the extent practical, the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. In addition, this criterion requires provisions to minimize the probability of losing electric power from the remaining electric power supplies as a result of loss of power from the unit, the offsite transmission network, or the onsite power supplies.

GDC 18, Inspection and testing of electric power systems, requires that electric power systems that are important to safety be designed to permit appropriate periodic inspection and testing.

Section 50.36, Technical specifications, of 10 CFR Part 50, requires a licensee's TS to be derived from the analyses and evaluation included in the safety analysis report. Section 50.36 also requires TS to include SRs relating to test, calibration, or inspection, to assure that necessary quality of systems and components is maintained, that the facility operation will be within safety limits, and that the limiting conditions for operation will be met.

Regulatory Guide (RG) 1.9, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants," Revision 3, Regulatory Position C.1.4 states that "each diesel generator unit should be capable of starting and accelerating to rated speed, in the required sequence, all the needed engineered safety feature and emergency shutdown loads. The diesel generator unit design should be such that at no time during the loading sequence should the frequency decrease to less than 95 percent of nominal nor the voltage decrease to less than 75 percent of nominal (a larger decrease in voltage and frequency may be justified for a diesel generator unit that carries only one large connected load). Frequency should be restored to within 2 percent of nominal in less than 60 percent of each load-sequence interval for step load increase and in less than 80 percent of each load-sequence interval for disconnection of the single largest load, and voltage should be restored to within 10 percent of nominal within 60 percent of each load-sequence time interval. (A greater percentage of the time interval may be used if it can be justified by analysis. However, the load-sequence time interval should include sufficient margin to account for the accuracy and repeatability of the load-sequence timer.)"

Regulatory Position C.2.2 of RG 1.9 provides details on surveillance tests to be performed to demonstrate diesel generator capabilities. These tests require verification that the EDG achieves required steady state voltage and frequency within acceptable limits and time as defined in the plant TSs.

4.0 TECHNICAL EVALUATION

According to the Braidwood and Byron Updated Final Safety Analyses Report (UFSAR), each unit has two EDGs that provide power to the emergency 4.16 kilo Volt (kV) buses. The Cooper-Bessemer diesel engines coupled to Electric Products generators have a continuous load rating of 5500 kilo Watts or 6875 kilo Volt Amps, at a 0.8 power factor.

The licensee proposed to revise the acceptance criteria of SR 3.8.1.7, SR 3.8.1.12, SR 3.8.15, and SR 3.8.1.20 consistent with the approved TSTF-163, Revision 2. The acceptance criteria for the EDG start tests would be modified by specifying the minimum voltage and frequency to be achieved during startup, and assigning the currently listed voltage and frequency ranges as values to be achieved once "steady state" is reached.

Currently, SR 3.8.1.7, 3.8.1.12, 3.8.1.15, and 3.8.1.20 verify that when started from standby conditions, each EDG achieves voltage $\geq$ 3950 V and $\leq$ 4580 V and frequency $\geq$ 58.8 Hz and $\leq$ 61.2 Hz in 10 seconds or less.

The licensee proposed to revise SR 3.8.1.7, 3.8.1.12, 3.8.1.15 and 3.8.1.20 to require that each EDG achieves a voltage $\geq$ 3950 V and a frequency $\geq$ 58.8 Hz in $\leq$ 10 seconds. After the startup period (10 seconds), the EDG must subsequently achieve a steady state voltage $\geq$ 3950 V and $\leq$ 4580 V, and frequency $\geq$ 58.8 Hz and $\leq$ 61.2 Hz, in accordance with the revised SR.

The changes that the licensee has proposed maintain the original voltage and frequency range for steady state conditions while, in the transient region (within the time limit less than 10 seconds), only minimum values are proposed in the allowable range. The licensee stated that when a test is performed that does not result in tying the EDG to the bus, a momentary voltage or frequency overshoot (and/or subsequent undershoot) can occur because no loads are being

tied to the EDG. The loading tends to minimize the overshoot, whereas the unloaded overshoot might momentarily exceed the specified limits within the first 10 seconds of startup. The licensee stated that this condition is inherent in the design and physical capabilities of the EDG governor as it seeks to control EDG speed during fast starts when the EDG is unloaded. The voltage and frequency excursions do not affect the permissive for closure of the EDG output breaker, because the permissive is primarily dependent on minimum conditions being achieved regardless of any overshoot or subsequent momentary undershoot. The requirement for verifying steady state voltage and frequency are met by tests required by SR 3.8.1.11 and SR 3.8.1.19. These SRs are associated with simulation of loss of offsite power and an actuation of engineered safety features signal, and they verify the capability of the EDGs to provide power at a voltage and frequency adequate to start and operate the safety loads.

The NRC staff agrees that the voltage and frequency range currently specified in the subject surveillances are more appropriate for steady state limits than transient limits, and that the revised SRs, as proposed, will continue to verify the capability of the EDGs to provide power at a voltage and frequency adequate to start and operate the safety loads. The NRC staff and the industry have reviewed and resolved this issue on a generic basis. Specifically, TSTF-163, Revision 2, which applies to SR 3.8.1.7, SR 3.8.1.12, SR 3.8.1.15 and 3.8.1.20, (1) eliminates the maximum voltage and frequency limits from the start test, (2) rewords the SRs to clarify that each EDG is required to achieve steady state operation following the timed start; and (3) provides that the time to reach steady state operation is periodically monitored and the trend evaluated to identify degradation of governor and voltage regulator performance.

In reviewing the LAR, the NRC staff reviewed the specific proposed change associated with the SRs for transient voltage and frequency conditions during EDG starts.

The NRC staff considers that the proposed amendments, described above and in the LAR, are consistent with TSTF-163, Revision 2, for eliminating the upper end of allowable voltage range during transient conditions experienced during EDG starts. The guidelines in RG 1.9, Revision 3, are applicable for ensuring that the transient response of the EDG remains within the allowable range during load sequencing. The NRC staff finds that the provisions of the revised SRs will continue to ensure that proper steady state voltage and frequency are attained consistent with proper EDG governor and voltage regulator performance. On this basis, the NRC staff finds the proposed amendments acceptable. These types of changes have already been incorporated into the improved standard TS.

In summary, the NRC staff evaluated the licensee's request to revise SRs 3.8.1.7, 3.8.1.12, 3.8.1.15, and 3.8.1.20 for EDG start time for Braidwood and Byron. The NRC staff's evaluation supports the proposed revision of the TS for the EDG surveillances. The NRC staff's conclusion is based on the following: (1) the elimination of upper end of allowable voltage for transient conditions during an unloaded EDG start does not degrade safety margins; and (2) the steady state voltage requirements are not impacted and compliance with the SRs will continue to demonstrate the performance capabilities of each EDG to maintain bus voltages within acceptable limits for achieving safe shutdown.

In conclusion, based on the above evaluation, the NRC staff finds the proposed changes to the Braidwood and Byron SRs provide reasonable assurance of the continued availability of the required electrical power to shut down the reactor and to maintain the reactor in a safe condition

after an anticipated operational occurrence or a postulated event. Furthermore, the NRC staff concludes that the proposed SR changes are in accordance with 10 CFR 50.36, and meet the intent of GDCs 17 and 18. The NRC staff also finds that the proposed SR changes meet the intent of RG 1.9 guidance for onsite power sources. Therefore, the NRC staff finds the proposed changes acceptable.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois State official was notified of the proposed issuance of the amendments. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of a facility's components located within the restricted area, as defined in 10 CFR Part 20, or changes 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 (73 FR 50360; August 26, 2008). 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.

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) 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: G. Matharu, NRR

Date: May 11, 2009

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

Sincerely,

/RA/

Marshall J. David, Senior Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-456, STN 50-457,
STN 50-454, and STN 50-455

Enclosures:
1. Amendment No. 159 to NPF-72
2. Amendment No. 159 to NPF-77
3. Amendment No. 164 to NPF-37
4. Amendment No. 164 to NPF-66
5. Safety Evaluation

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