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

June 29, 2011

Mr. Michael J. Pacilio
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: LOW TEMPERATURE OVERPRESSURE PROTECTION AND LOSS OF DECAY HEAT REMOVAL (TAC NOS. ME4194, ME4195, ME4196, AND ME4197)

Dear Mr. Pacilio:

The U.S. Nuclear Regulatory Commission (NRC, the Commission) has issued the enclosed Amendment No. 167 to Facility Operating License No. NPF-72 and Amendment No. 167 to Facility Operating License No. NPF-77 for the Braidwood Station (Braidwood), Units 1 and 2, respectively, and Amendment No. 174 to Facility Operating License No. NPF-37 and Amendment No. 174 to Facility Operating License No. NPF-66 for the Byron Station (Byron), Unit Nos. 1 and 2, respectively. The amendments are in response to your application dated June 29, 2010, as supplemented by letters dated August 24, 2010, and January 13, 2011, to amend the technical specifications (TS) for the Braidwood and Byron Stations.

The amendments allow one or more safety injection pumps to be available for injection into the Reactor Coolant System in MODE 5 and MODE 6 when the reactor vessel head is on, provided pressurizer level is ≤ 5 percent, for the purpose of protecting the decay heat removal function. A copy of the SE is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

Nicholas J. DiFrancesco, 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. 167 to NPF-72
2. Amendment No. 167 to NPF-77
3. Amendment No. 174 to NPF-37
4. Amendment No. 174 to NPF-66
5. Safety Evaluation

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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. 167
License No. NPF-72

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

   A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated June 29, 2010, as supplemented by letters dated August 24, 2010, and January 13, 2011, 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.

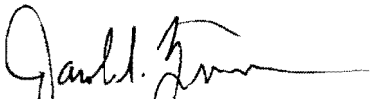
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-72 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 167 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



Jacob I. Zimmerman, 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: June 29, 2011

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. 167
License No. NPF-77

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

   A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated June 29, 2010, as supplemented by letters dated August 24, 2010, and January 13, 2011, 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.

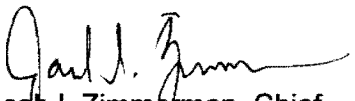
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-77 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 167 and the Environmental Protection Plan contained in Appendix B, both of which were 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 if its issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Jacob I. Zimmerman, 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: June 29, 2011

ATTACHMENT TO LICENSE AMENDMENT NOS. 167 AND 167

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 Appendix A Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
License NPF-72 Page 3	License NPF-72 Page 3
License NPF-77 Page 3	License NPF-77 Page 3
TSs 3.4.12-1	TSs 3.4.12-1

(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 is 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. 167, 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 is 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. 167, 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.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12 Low Temperature Overpressure Protection (LTOP) System

LCO 3.4.12 An LTOP System shall be OPERABLE with:

a. A maximum of one charging pump (centrifugal) capable of injecting into the RCS;

b. No Safety Injection (SI) pumps capable of injecting into the RCS;

c. Each SI accumulator isolated, whose pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in the PTLR; and

d. One of the following pressure relief capabilities:

1. Two Power Operated Relief Valves (PORVs) with lift settings within the limits specified in the PTLR,

2. Two Residual Heat Removal (RHR) suction relief valves with setpoints ≤ 450 psig,

3. One PORV with a lift setting within the limits specified in the PTLR and one RHR suction relief valve with a setpoint ≤ 450 psig, or

4. The RCS depressurized and an RCS vent of ≥ 2.0 square inches.

----------NOTES----------

1. Operation in MODE 4 with all SI pumps and charging pumps capable of injecting into the RCS is allowed when all RCS cold legs exceed 330°F.

2. For the purpose of protecting the decay heat removal function, one or more SI pumps may be capable of injecting into the RCS in MODE 5 and MODE 6 when the reactor vessel head is on provided pressurizer level is ≤ 5 percent.

APPLICABILITY: MODES 4 and 5,
MODE 6 when the reactor vessel head is on.

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. 174
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 29, 2010, as supplemented by letters dated August 24, 2010, and January 13, 2011, 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.

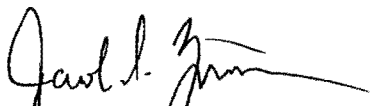
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-37 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 174 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



Jacob I. Zimmerman, 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: June 29, 2011

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. 174
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 29, 2010, as supplemented by letters dated August 24, 2010, and January 13, 2011, 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. 174 and the Environmental Protection Plan contained in Appendix B, both of which were 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

Jacob I. Zimmerman, 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: June 29, 2011

ATTACHMENT TO LICENSE AMENDMENT NOS. 174 AND 174

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 License and Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
License NPF-37 Page 3	License NPF-37 Page 3
License NPF-66 Page 3	License NPF-66 Page 3
TSs 3.4.12-1	TSs 3.4.12-1

(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. This 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 power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No.174 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 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. This 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. 174, and the Environmental Protection Plan contained in Appendix B, both of which were 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.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12 Low Temperature Overpressure Protection (LTOP) System

LCO 3.4.12 An LTOP System shall be OPERABLE with:

a. A maximum of one charging pump (centrifugal) capable of injecting into the RCS;

b. No Safety Injection (SI) pumps capable of injecting into the RCS;

c. Each SI accumulator isolated, whose pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in the PTLR; and

d. One of the following pressure relief capabilities:

1. Two Power Operated Relief Valves (PORVs) with lift settings within the limits specified in the PTLR,

2. Two Residual Heat Removal (RHR) suction relief valves with setpoints ≤ 450 psig,

3. One PORV with a lift setting within the limits specified in the PTLR and one RHR suction relief valve with a setpoint ≤ 450 psig, or

4. The RCS depressurized and an RCS vent of ≥ 2.0 square inches.

----------NOTES----------

1. Operation in MODE 4 with all SI pumps and charging pumps capable of injecting into the RCS is allowed when all RCS cold legs exceed 330°F.

2. For the purpose of protecting the decay heat removal function, one or more SI pumps may be capable of injecting into the RCS in MODE 5 and MODE 6 when the reactor vessel head is on provided pressurizer level is ≤ 5 percent.

APPLICABILITY: MODES 4 and 5,
MODE 6 when the reactor vessel head is on.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 167 TO FACILITY OPERATING LICENSE NO. NPF-72, AMENDMENT NO. 167 TO FACILITY OPERATING LICENSE NO. NPF-77, AMENDMENT NO. 174 TO FACILITY OPERATING LICENSE NO. NPF-37, AND AMENDMENT NO. 174 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 U.S. Nuclear Regulatory Commission (NRC, the Commission) dated June 29, 2010, as supplemented by letters dated August 24, 2010, and January 13, 2011 (Agencywide Documents Access and Management System (ADAMS) Nos. ML101810069, ML102360663, and ML110140069, respectively), Exelon Generation Company, LLC (EGC, the licensee) submitted a license amendment request (LAR) to change the facility operating licenses and the technical specifications (TSs), for the Braidwood Station (Braidwood), Units 1 and 2 and Byron Station (Byron), Unit Nos. 1 and 2. The proposed changes would allow one or more Safety Injection (SI) pumps to be available for injection into the reactor coolant system (RCS) in MODE 5 and MODE 6 when the reactor vessel head is on, provided pressurizer level is ≤ 5 percent, for the purpose of protecting the decay heat removal (DHR) function. This strategy was approved by NRC in its safety evaluation for Byron and Braidwood dated August 31, 1990 (ADAMS Accession No. ML020860179), but was inadvertently removed from TS during the transition to Improved Technical Specifications (ITS). All four units have been operating using the strategy approved in 1990, i.e., procedures, training, displays and controls, and simulation to reflect the low-temperature overpressure protection (LTOP).

Supplement information provided by letters dated August 24, 2010, and January 13, 2011, contained clarifying information and did not change the NRC staff's initial proposed finding of no significant hazards consideration.

2.0 REGULATORY EVALUATION

The NRC staff finds that the licensee identified the applicable regulatory requirements in Attachment 1 to its June 29, 2010, submittal letter, as quoted below:

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TS as part of the license. The Commission's regulatory requirements related to the content of the TS are contained in [Title 10 of the *Code of Federal Regulations*] 10 CFR 50.36, "Technical specifications." The TS requirements in 10 CFR 50.36 include the following categories: (1) safety limits, limiting safety systems settings and control settings, (2) limiting conditions for operation (LCO), (3) surveillance requirements, (4) design features, and (5) administrative controls.

The LTOP system controls RCS pressure at low temperatures so the integrity of the Reactor Coolant Pressure Boundary is not compromised by violating the pressure and temperature limits of 10 CFR Part 50, Appendix G, "Fracture Toughness Requirements."

In [Generic Letter] GL 88-17 ["Loss of Decay Heat Removal"], the NRC requested licensees to take actions to address concerns with a potential loss of decay heat removal [DHR]. [By license amendments dated August 31, 1990], the NRC approved TS changes for Braidwood Station and Byron Station to allow one or more SI pumps to be available for injection purposes if normal heat removal capability was lost. The NRC concluded that the TS changes were acceptable and consistent with GL 88-17.

The proposed change corrects an inconsistency between the Braidwood Station and Byron Station TS for the LTOP system, and actions that are necessary to mitigate a postulated loss of decay heat removal during mid-loop operation as discussed in GL 88-17. The proposed change maintains compliance with the regulatory requirements discussed above.

3.0 TECHNICAL EVALUATION

In Attachment 1 to its June 29, 2010, submittal letter, the licensee stated the following:

The proposed change revises Technical Specifications (TS) 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," to correct an inconsistency between the TS, and implementation of procedures and administrative controls for Safety Injection (SI) pumps required to mitigate a postulated loss of decay heat removal during mid-loop operation as discussed in NRC Generic Letter (GL) 88-17, "Loss of Decay Heat Removal." . . . Specifically, the proposed change adds a note to TS Limiting Condition for Operation (LCO) 3.4.12 that states: "For the purpose of protecting the decay heat removal function, one or more SI pumps may be capable of injecting into the RCS in MODE 5 and MODE 6 when the reactor vessel head is on provided pressurizer level is ≤ 5 percent." The proposed change corrects an oversight introduced during the conversion of the Braidwood Station and Byron Station TS to the Improved Technical Specifications (ITS). [...]

The proposed change is necessary for the purpose of mitigating the consequences of a loss of decay heat removal during mid-loop operations. Operation of at least one SI pump is required in some cases to prevent the core from uncovering. The only new configuration allowed by the proposed change is the potential of having one or more SI pumps available in Modes 5 and 6 with pressurizer level ≤ 5 percent. The potential over pressurization accident has been analyzed and accounted for by requiring pressurizer level to be ≤ 5 percent if one or more SI pumps are available.

The NRC staff concludes, therefore, that the licensee's request is consistent with the intent of GL 88-17, i.e., the proposed TS change would allow for the operation of one or more SI pumps in the event of a loss of residual heat removal (RHR).

The licensee also stated that,

> The availability of SI pumps under these circumstances does not present a concern regarding cold overpressure protection since sufficient air volume exists which allows operations personnel time to mitigate the transient. This is in contrast to the analyzed cold overpressure transients, in which the RCS is assumed to be water solid at the onset of the event.

The NRC staff finds, therefore, that the proposed change will remain in compliance with the requirements of 10 CFR 50, Appendix G, because the analyzed cold-over pressure events are bounding of SI operation with pressurizer level less than 5 percent.

3.1 Description of Operator Action(s) Added/Changed/Deleted

As a result of its review of operator actions, the licensee has identified no new operator actions are required, nor any actions that are affected by the proposed LAR, including any effects on the time available for, or the time required to, perform operator actions as indicated in the supplemental information letter of January 13, 2011. The addition of the note in the TS allowing SI pumps to be available will reflect current plant operation, in practice since its original NRC approval in August 31, 1990. No changes to procedures are needed to support the proposed license amendment.

3.2 Operating Experience Review

The licensee stated in its supplement dated August 24, 2010, that,

> . . . the NRC previously granted a license amendment for Braidwood Station and Byron Station (i.e., August 31, 1990) to allow use of an SI pump in Mode 5 and in Mode 6 when the reactor vessel head is on and with pressurizer level is ≤ 5 percent.
>
> In addition, the TS for other pressurized water reactors in the U.S. nuclear power industry have been reviewed. TS 3.4.12 for Callaway Plant, Unit No. 1, (i.e., ADAMS Accession No. ML053110040) contains wording similar to the proposed license amendment. [...]
>
> TS 3.4.12 for Wolf Creek Generating Station, Unit 1, (i.e., ADAMS Accession [No.] ML052720315) also contains a similar [note.]

The NRC staff agrees with the licensee's assessment and finds the licensee's position on operating experience acceptable.

3.3 Functional Requirements Analysis and Function Allocation

Since the operator actions associated with the proposed note in the TSs are not new actions, a re-analysis of the functional requirements analysis and function allocation were not necessary. If

the licensee's engineering analysis had shown that the required tasks had changed since their original approval in August 31, 1990, the NRC staff would have expected a reconsideration of allocation of this function. However, this was not the case, as stated by the licensee in the letter dated January 13, 2011, and so, there was no need for either a new or revised functional requirements analysis or a reallocation of function. The NRC staff finds the EGC approach acceptable based on the fact that there have been no substantial change to any of the actions associated with the proposed note since its original approval by the NRC staff in August 31, 1990.

3.4 Task Analysis

Since this operator action is not a new action, the only aspect requiring reanalysis was the confirmation of time constraints for the action sequence. The licensee's review of modification history of the simulator did not identify any changes that would appreciably impact the time for initiating SI to the RCS in response to a loss of DHR event. Based on this review, and reviews of station procedures and standards, no issues involving modifications were identified that could have added to the workload of operators in a manner that would prevent them from timely initiation of SI.

There were minor changes to the stroke times for the following valves:

Valve No.	Description
1/2S18802A/B	RCS hot-leg injection valves
1/2S18809A	RHR system to cold-legs A and D isolation valves
1/2S18821	SI pump to cold-legs isolation valves

The licensee further stated that the changes in stroke times for the above valves would not prevent timely initiation of SI to the RCS in response to a loss of decay heat removal event. The NRC staff concludes that revision of the licensee's task analysis is not necessary, because the actions associated with this proposed note to TSs have not changed.

3.5 Staffing

The licensee staffing and qualifications are not affected by the proposed LAR. No new or additional staff is required, nor are there any new or additional qualifications required to perform the action sequence within the time constraints established. The NRC staff concludes that no additional staffing or qualifications, or changes thereto, are required, and finds this human performance aspect of the LAR acceptable.

3.6 Human-System Interface (HSI) Design

The licensee stated in its supplement dated August 24, 2010, that HSI design of the control rooms and the simulator, including the design of the safety parameter display system will not be affected by the proposed LAR. The same controls, displays, and alarms that have been successfully used in the past will continue to be used under the proposed LAR. Based on the fact that no changes are needed to the HSI design, the NRC staff finds the EGC proposal acceptable.

3.7 Procedure Design

The licensee stated in its August 24, 2010, submittal that no procedures are affected by the proposed LAR. Current procedures already reflect the inclusion of the proposed note in TSs. The NRC staff finds the licensee position acceptable based on the fact that no changes to, additions to, or deletions of personnel actions are required to support the proposed LAR.

3.8 Training Program Design

The licensee stated in the January 13, 2011, supplement that,

> The operators are trained on a loss of [D]HR prior to every outage in accordance with the [Institute of Nuclear Power Operations] Significant Operating Experience Report (SOER) 09-1, "Shutdown Safety." In accordance with the licensee's Shutdown Safety Management Program, operators are briefed at least once per shift on the time to RCS boil and the time to core uncovery, as well as the priorities for restoring RCS cooling in the event of a loss of [DHR] event (e.g., steaming intact/non-isolated steam generators, feed and bleed, refuel cavity to fuel pool cooling, SI pump hot-leg injection, accumulator injection, and inventory addition from the refueling water storage tank). In addition, an Infrequent Plant Activity (IPA) briefing, which includes Just-In-Time [J-I-T] training, is conducted in accordance with Byron operating procedure (BOP RC-4) and Braidwood operating procedure (BwOP RC-4) for performing a RCS drain prior to lowering level to the reactor vessel flange and whenever the RCS is taken to a reduced inventory condition.

Also, the licensed stated in the August 24, 2010, submittal that licensed operators will continue to receive training on the abnormal operating procedures for loss of DHR as part of the licensed operator training programs.

Based on the facts, the action sequence will continue to be included in the training program and that the training has been implemented prior to amending the TS, the NRC staff finds that the training to be provided is acceptable.

3.9 Human Factors Verification and Validation

According to NUREG-0711, "Human Factors Engineering Program Review Model," the scope of Human Factors Engineering programs design verification may be restricted to the modified HSIs and their interactions with the rest of the HSIs. NUREG-0711 also states that, "Integrated system validation may not be needed when a modification results in minor changes to personnel tasks such that they may reasonably be expected to have little or no overall effect on workload and the likelihood of error." In this case, there were no modifications required to support the proposed change to TSs; therefore, the NRC staff concludes that no additional design verification or validation is necessary.

3.10 Human Performance Monitoring Strategy

The actions proposed by this LAR, using SI to mitigate a loss of DHR, will be included in the licensee's J-I-T training prior to every refueling outage. Licensed operators will continue to

receive training on the abnormal operating procedures for loss of the RHR system cooling as part of the licensed operator and requalification training programs.

Based on the administrative protections afforded by the licensee's procedure control program against inadvertent change, and by the periodic re-validation provided by J-I-T training prior to each refueling outage, the NRC staff finds the EGC long-term monitoring strategy acceptable.

3.11 Conclusion

The NRC staff finds that the proposed change is acceptable. The allowance for one or more SI pumps to be capable of injecting into the RCS when in MODE 5 or MODE 6 provides the required protection against the issues identified in GL 88-17. Also, requiring the pressurizer level to be less than 5 percent for such injection to occur provides adequate margin to ensure that the analysed LTOP events bound the proposed SI cooling under loss of DHR conditions, consistent with the requirements of 10 CFR 50, Appendix G.

Based on the evidence provided by EGC, i.e., that no changes to procedures, training, and human interface design are required to support the proposed LAR, and that appropriate administrative controls are being applied to procedures, training, and human interface design to prevent inadvertent changes in the future, the NRC staff concludes that the proposed LAR is acceptable from the human performance point of view.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

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 (75 FR 61526; October 5, 2010). 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) 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: George W. Lapinsky
Ben Parks

Date of issuance: June 29, 2011

June 29, 2011

Mr. Michael J. Pacilio
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: LOW TEMPERATURE OVERPRESSURE PROTECTION AND LOSS OF DECAY HEAT REMOVAL (TAC NOS. ME4194, ME4195, ME4196, AND ME4197)

Dear Mr. Pacilio:

The U.S. Nuclear Regulatory Commission (NRC, the Commission) has issued the enclosed Amendment No. 167 to Facility Operating License No. NPF-72 and Amendment No. 167 to Facility Operating License No. NPF-77 for the Braidwood Station (Braidwood), Units 1 and 2, respectively, and Amendment No. 174 to Facility Operating License No. NPF-37 and Amendment No. 174 to Facility Operating License No. NPF-66 for the Byron Station (Byron), Unit Nos. 1 and 2, respectively. The amendments are in response to your application dated June 29, 2010, as supplemented by letters dated August 24, 2010, and January 13, 2011, to amend the technical specifications (TS) for the Braidwood and Byron Stations.

The amendments allow one or more safety injection pumps to be available for injection into the Reactor Coolant System in MODE 5 and MODE 6 when the reactor vessel head is on, provided pressurizer level is ≤ 5 percent, for the purpose of protecting the decay heat removal function. A copy of the SE is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,
/RA/
Nicholas J. DiFrancesco, 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. 167 to NPF-72
2. Amendment No. 167 to NPF-77
3. Amendment No. 174 to NPF-37
4. Amendment No. 174 to NPF-66
5. Safety Evaluation

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ADAMS Accession No. ML110840657 *via SE memo **With Comments

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