

RS-10-114

10 CFR 50.90

June 29, 2010

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Braidwood Station, Units 1 and 2  
Facility Operating License Nos. NPF-72 and NPF-77  
NRC Docket Nos. STN 50-456 and STN 50-457

Byron Station, Units 1 and 2  
Facility Operating License Nos. NPF-37 and NPF-66  
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: License Amendment Request Regarding Low Temperature Overpressure Protection and Loss of Decay Heat Removal

- References:
1. NRC Generic Letter 88-17, "Loss of Decay Heat Removal," dated October 17, 1988
  2. Letter from G. Stanley and K. Graesser (Commonwealth Edison Company) to U.S. NRC, "Application for Amendment to Appendix A, Technical Specifications – Conversion to the Improved Standard Technical Specifications," dated December 13, 1996
  3. Letter from R. R. Assa (U.S. NRC) to O. D. Kingsley (Commonwealth Edison Company), "Issuance of Amendments (TAC NOS. M97546, M97547, M97548 and M97549)," dated December 22, 1998

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (EGC) requests an amendment to Facility Operating License Nos. NPF-72 and NPF-77 for Braidwood Station, Units 1 and 2, and Facility Operating License Nos. NPF-37 and NPF-66 for Byron Station, Units 1 and 2. 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," (i.e., Reference 1). 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  $\leq$  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 (i.e., References 2 and 3).

This request is subdivided as follows.

- Attachment 1 provides a description and evaluation of the proposed change.
- Attachment 2 provides a markup of the affected TS page for Braidwood Station.
- Attachment 3 provides a markup of the affected TS page for Byron Station.
- Attachments 4 and 5 provide a markup of the affected TS Bases page for Braidwood Station and Byron Station, respectively. The TS Bases pages are provided for information only and do not require NRC approval.

The proposed change has been reviewed by the Braidwood Station and Byron Station Plant Operations Review Committees and approved by the Nuclear Safety Review Board in accordance with the requirements of the EGC Quality Assurance Program.

EGC requests approval of the proposed change by June 29, 2011. Once approved, the amendment will be implemented within 60 days. This implementation period will provide adequate time for the affected station documents to be revised using the appropriate change control mechanisms.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b), EGC is notifying the State of Illinois of this application for license amendment by transmitting a copy of this letter and its attachments to the designated State Official.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this letter, please contact Mr. Kenneth M. Nicely at (630) 657-2803.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 29th day of June 2010.

Respectfully,



Jeffrey L. Hansen  
Manager – Licensing

Attachments:

1. Evaluation of Proposed Change
2. Markup of Proposed Technical Specifications Page for Braidwood Station
3. Markup of Proposed Technical Specifications Page for Byron Station
4. Markup of Proposed Technical Specifications Bases Page for Braidwood Station
5. Markup of Proposed Technical Specifications Bases Page for Byron Station

cc: NRC Regional Administrator, Region III  
NRC Senior Resident Inspector – Braidwood Station  
NRC Senior Resident Inspector – Byron Station  
Illinois Emergency Management Agency – Division of Nuclear Safety

**ATTACHMENT 1**  
**Evaluation of Proposed Change**

- 1.0 SUMMARY DESCRIPTION
- 2.0 DETAILED DESCRIPTION
- 3.0 TECHNICAL EVALUATION
- 4.0 REGULATORY EVALUATION
  - 4.1 Applicable Regulatory Requirements/Criteria
  - 4.2 No Significant Hazards Consideration
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- 5.0 ENVIRONMENTAL CONSIDERATION
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# ATTACHMENT 1

## Evaluation of Proposed Change

### 1.0 SUMMARY DESCRIPTION

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (EGC) requests an amendment to Facility Operating License Nos. NPF-72 and NPF-77 for Braidwood Station, Units 1 and 2, and Facility Operating License Nos. NPF-37 and NPF-66 for Byron Station, Units 1 and 2. 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," (i.e., Reference 1). 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  $\leq$  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) (i.e., Reference 2 and Reference 3).

### 2.0 DETAILED DESCRIPTION

LCO 3.4.12 requires, in part, an LTOP system to be operable with no SI pumps capable of injecting into the Reactor Coolant System (RCS).

The proposed change adds a new Note to LCO 3.4.12 which states:

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  $\leq$  5 percent.

The existing LCO 3.4.12 Note is numbered as Note 1.

### 3.0 TECHNICAL EVALUATION

On October 17, 1988, the NRC issued GL 88-17 to request licensees to take actions to address concerns with a potential loss of decay heat removal. In response to GL 88-17, a review was performed to identify TS changes, for Braidwood Station and Byron Station, which might prevent or mitigate the consequences of a loss of decay heat removal event. The review concluded that a TS change was necessary to allow one or more SI pumps to be available for injection purposes if normal heat removal capability was lost. Commonwealth Edison (ComEd) submitted a license amendment request in Reference 4 to add this allowance, and the NRC approved the license amendment request in Reference 5.

The allowance for one or more SI pumps to be available for injection purposes if normal heat removal capability was lost was incorporated into Braidwood Station and Byron Station TS 3.5.4.2, and remained part of TS 3.5.4.2 until conversion of the Braidwood Station and Byron Station TS to the Improved Technical Specifications (ITS). Specifically, prior to conversion to the ITS, Current Technical Specifications (CTS) 3.5.4.1 required all SI pumps to be inoperable in Mode 5 with pressurizer level greater than 5 percent, and in Mode 6 with pressurizer level

## ATTACHMENT 1 Evaluation of Proposed Change

greater than 5 percent and the reactor vessel head resting on the reactor vessel flange. In addition, prior to the conversion to the ITS, CTS 3.5.4.2 required at least one SI pump and flowpath to be available in Modes 5 and 6 with pressurizer level less than or equal to 5 percent.

The CTS requirements discussed above were evaluated and issued by the NRC in a safety evaluation dated August 31, 1990 (i.e., Reference 5). Section 2.2 of the Safety Evaluation states:

The availability of a Safety Injection (SI) pump provides for the mitigation of the effects of a loss of decay heat removal event during mid-loop operations. Operation of at least one SI pump is required in some cases to prevent core uncover. The licensee proposes to have an SI pump available in Modes 5 and 6. The potential for low temperature overpressurization has been analyzed and accounted for in the Specification by requiring pressurizer level to be less than 5 percent if the SI pump is available. It is the licensee's intention that during RCS reduced inventory conditions, the safety injection pump motor circuit breakers will be racked in and the pump secured by placing the Control Room handswitch in the Pull-to-Lock position. This will prevent the safety injection pump from being inadvertently started by a signal, but will allow the operators to start the pump from the Control Room if needed to mitigate a loss of decay heat removal.

This modification is consistent with Generic letter 88-17 and is acceptable.

SI pump capability to inject into the RCS in Mode 5 with pressurizer level  $\leq$  5 percent and in Mode 6 when the reactor vessel head is on and pressurizer level is  $\leq$  5 percent is controlled in accordance with existing plant procedures. As discussed in Reference 4, 5 percent pressurizer level was used as the reference water level to ensure that the necessary surge volume in the pressurizer while minimizing the burden on Operations personnel. The availability of one or more SI pumps in Mode 5 and Mode 6, with pressurizer level  $\leq$  5 percent, mitigates the consequences of a loss of decay heat removal event during mid-loop operations. The availability of one or more SI pumps under these circumstances does not present a concern for 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.

During the conversion of the Braidwood Station and Byron Station TS to the ITS (i.e., References 2 and 3), the requirements of CTS 3.5.4.1 were incorporated in TS 3.4.12. However, the Applicability dependence on pressurizer level was not incorporated in TS 3.4.12. Based on a review of the "Discussion of Changes to CTS," for ITS Section 3.4, "Reactor Coolant System," it was determined that although the more restrictive aspects of the ITS Completion Time were discussed with respect to CTS 3.5.4.1, the more restrictive aspects of the ITS Applicability were not similarly discussed. The ITS conversion resulted in an unintended more restrictive change to the Mode of Applicability for the SI pump capability to inject in Mode 5 and Mode 6 when the reactor vessel head is on. This resulted in a conflict with the recommendations and guidance of GL 88-17 regarding mitigation of loss of decay heat removal during mid-loop operations.

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### **Evaluation of Proposed Change**

The potential for vessel overpressurization is most acute when the RCS is water solid, occurring only while shutdown; a pressure fluctuation can occur more quickly than an operator can react to relieve the condition. To limit the coolant input capability, LCO 3.4.12 requires, in part, that no SI pumps be capable of injecting into the RCS. The proposed note allows one or more SI pumps to be capable of injecting into the RCS only when pressurizer level is  $\leq 5$  percent in Mode 5 and Mode 6 when the reactor vessel head is on. This provides protection to limit coolant input capacity during shutdown in which a pressure fluctuation due to coolant input from the SI pumps could occur more quickly than an operator could react, while providing an allowance for one or more SI pumps to be capable of injecting into the RCS during conditions in which a loss of decay heat removal could result in rapid core uncover.

The proposed change is acceptable because: (1) it resolves a conflict between LTOP requirements and mitigation of a postulated loss of decay heat removal during mid-loop operation, (2) it is consistent with the Braidwood Station and Byron Station licensing bases that existed prior to the introduction of an unintended more restrictive change, and (3) it is consistent with GL 88-17.

#### **4.0 REGULATORY EVALUATION**

##### **4.1 Applicable Regulatory Requirements/Criteria**

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 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 50, Appendix G, "Fracture Toughness Requirements."

In GL 88-17, the NRC requested licensees to take actions to address concerns with a potential loss of decay heat removal. In Reference 5, 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.

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**Evaluation of Proposed Change**

**4.2 No Significant Hazards Consideration**

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (EGC) requests an amendment to Facility Operating License Nos. NPF-72 and NPF-77 for Braidwood Station, Units 1 and 2, and Facility Operating License Nos. NPF-37 and NPF-66 for Byron Station, Units 1 and 2. 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  $\leq$  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).

According to 10 CFR 50.92, "Issuance of amendment," paragraph (c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

- (1) Involve a significant increase in the probability or consequences of any accident previously evaluated; or
- (2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or
- (3) Involve a significant reduction in a margin of safety.

EGC has evaluated the proposed change, using the criteria in 10 CFR 50.92, and has determined that the proposed change does not involve a significant hazards consideration. The following information is provided to support a finding of no significant hazards consideration.

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed change does not result in any physical changes to safety related structures, systems, or components. The proposed change revises TS 3.4.12 to correct an inconsistency between the TS, and implementation of procedures and administrative controls for SI pumps required to mitigate a postulated loss of decay heat removal during mid-loop operation as discussed in GL 88-17. Specifically, the proposed change adds a note to TS LCO 3.4.12 that states: "For the purpose of protecting the decay heat removal function, one or more SI

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**Evaluation of Proposed Change**

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  $\leq 5$  percent." The proposed change corrects an oversight introduced during the conversion of the Braidwood Station and Byron Station TS to the ITS.

The probability of occurrence of an accident is not increased since the proposed change will continue to require that no SI pumps are capable of injecting into the RCS in Modes 5 and 6 with pressurizer level greater than 5 percent.

The NRC has previously evaluated the allowance for one or more SI pumps to be capable of injecting into the RCS in Mode 5 or Mode 6 when the reactor vessel head is on provided pressurizer level is  $\leq 5$  percent for the Braidwood Station and Byron Station. In a safety evaluation dated August 31, 1990, related to Braidwood Station, Units 1 and 2, Amendment 25, and Byron Station, Units 1 and 2, Amendment 38, the NRC concluded that allowing SI pump capability to inject into the RCS in Mode 5 or Mode 6 when the reactor vessel head is on provided pressurizer level is  $\leq 5$  percent was acceptable. 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.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed change revises TS 3.4.12 to correct an inconsistency between the TS, and implementation of procedures and administrative controls for SI pumps required to mitigate a postulated loss of decay heat removal during mid-loop operation as discussed in GL 88-17. Specifically, the proposed change adds a note to TS 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  $\leq 5$  percent." The proposed change corrects an oversight introduced during the conversion of the Braidwood Station and Byron Station TS to the 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  $\leq 5$  percent. The potential overpressurization accident has

**ATTACHMENT 1**  
**Evaluation of Proposed Change**

been analyzed and accounted for by requiring pressurizer level to be  $\leq 5$  percent if one or more SI pumps are available.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No

The proposed change revises TS 3.4.12 to correct an inconsistency between the TS, and implementation of procedures and administrative controls for SI pumps required to mitigate a postulated loss of decay heat removal during mid-loop operation as discussed in GL 88-17. Specifically, the proposed change adds a note to TS 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  $\leq 5$  percent." The proposed change corrects an oversight introduced during the conversion of the Braidwood Station and Byron Station TS to the ITS.

The proposed note allows one or more SI pumps to be capable of injecting into the RCS only when pressurizer level is  $\leq 5$  percent in Mode 5 and Mode 6 when the reactor vessel head is on. This provides protection to limit coolant input capacity during shutdown in which a pressure fluctuation due to coolant input from the SI pumps could occur more quickly than an operator could react, while providing an allowance for one or more SI pumps to be capable of injecting into the RCS during conditions in which a loss of decay heat removal could result in rapid core uncover.

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

Based on the above evaluation, EGC concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92, paragraph (c), and accordingly, a finding of no significant hazards consideration is justified.

#### **4.3 Conclusions**

In conclusion, based on the considerations discussed above, (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 amendment will not be inimical to the common defense and security or the health and safety of the public.

**ATTACHMENT 1**  
**Evaluation of Proposed Change**

**5.0 ENVIRONMENTAL CONSIDERATION**

EGC has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation." However, the proposed amendment does not involve: (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," paragraph (c)(9). Therefore, pursuant to 10 CFR 51.22, paragraph (b), no environmental impact statement or environmental assessment needs to be prepared in connection with the proposed amendment.

**6.0 REFERENCES**

1. NRC Generic Letter 88-17, "Loss of Decay Heat Removal," dated October 17, 1988
2. Letter from G. Stanley and K. Graesser (Commonwealth Edison Company) to U.S. NRC, "Application for Amendment to Appendix A, Technical Specifications – Conversion to the Improved Standard Technical Specifications," dated December 13, 1996
3. Letter from R. R. Assa (U.S. NRC) to O. D. Kingsley (Commonwealth Edison Company), "Issuance of Amendments (TAC NOS. M97546, M97547, M97548 and M97549)," dated December 22, 1998
4. Letter from T. K. Schuster (Commonwealth Edison Company) to T. E. Murley (U.S. NRC), "Application for Amendment to Facility Operating Licenses NPF-37/66 & NPF-72/77 – Implementation of Generic Letter 88-17," dated January 31, 1990
5. Letter from S. P. Sands (U.S. NRC) to T. J. Kovach (Commonwealth Edison Company), "Issuance of Amendments (TAC NOS. 76715, 76716, 76717 and 76718)," dated August 31, 1990

**ATTACHMENT 2**  
**Markup of Proposed Technical Specifications Page for Braidwood Station**

**Braidwood Station, Units 1 and 2**  
**Facility Operating License Nos. NPF-72 and NPF-77**

REVISED TECHNICAL SPECIFICATIONS PAGE

3.4.12-1

### 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  $\leq 450$  psig,
  3. One PORV with a lift setting within the limits specified in the PTLR and one RHR suction relief valve with a setpoint  $\leq 450$  psig, or
  4. The RCS depressurized and an RCS vent of  $\geq 2.0$  square inches.

1.

NOTE  
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.

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

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  $\leq 5$  percent.

**ATTACHMENT 3**  
**Markup of Proposed Technical Specifications Page for Byron Station**

**Byron Station, Units 1 and 2**  
**Facility Operating License Nos. NPF-37 and NPF-66**

REVISED TECHNICAL SPECIFICATIONS PAGE

3.4.12-1

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  $\leq 450$  psig,
  - 3. One PORV with a lift setting within the limits specified in the PTLR and one RHR suction relief valve with a setpoint  $\leq 450$  psig, or
  - 4. The RCS depressurized and an RCS vent of  $\geq 2.0$  square inches.

1.

NOTE  
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.

S

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

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  $\leq 5$  percent.

**ATTACHMENT 4**  
**Markup of Proposed Technical Specifications Bases Page for Braidwood Station**

**Braidwood Station, Units 1 and 2**

**Facility Operating License Nos. NPF-72 and NPF-77**

**REVISED TECHNICAL SPECIFICATIONS BASES PAGE**

B 3.4.12-9

BASES

LCO

This LCO requires that the LTOP System is OPERABLE. The LTOP System is OPERABLE when the minimum coolant input and pressure relief capabilities are OPERABLE. Violation of this LCO could lead to the loss of low temperature overpressure mitigation capability and violation of the Reference 1 limits as a result of an operational transient.

To limit the coolant input capability, the LCO requires no SI pumps and a maximum of one charging pump (centrifugal) be capable of injecting into the RCS, and all accumulator discharge isolation valves be closed and de-energized (when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed in the PTLR).

two notes. Note 1

The LCO is modified by ~~a note that~~ permits the operation in MODE 4 with all SI pumps and charging pumps capable of RCS injection whenever all RCS cold legs exceed 330°F. This is necessary to allow transition between MODES 3 and 4.

The elements of the LCO that provide low temperature overpressure mitigation through pressure relief are:

- a. Two OPERABLE PORVs;
- b. Two OPERABLE RHR suction relief valves;
- c. One OPERABLE PORV and one OPERABLE RHR suction relief valve; or
- d. A depressurized RCS and an OPERABLE RCS vent.

A PORV is OPERABLE for LTOP when its block valve is open, its lift setpoint is set to the limit required by the PTLR and testing proves its ability to open at this setpoint, and motive power is available to the two valves and their control circuits.

An RHR suction relief valve is OPERABLE for LTOP when its RHR suction isolation valves are open, its setpoint is  $\leq 450$  psig, and testing has proven its ability to open at this setpoint.

Note 2 permits operation in MODE 5 and in MODE 6 when the reactor vessel head is on with one or more SI pumps capable of RCS injection whenever pressurizer level is  $\leq 5$  percent. This is necessary to provide for the mitigation of the effects of a loss of decay heat removal cooling event during mid-loop operations. Operation of at least one SI pump is required in some instances to prevent core uncover.

**ATTACHMENT 5**  
**Markup of Proposed Technical Specifications Bases Page for Byron Station**

**Byron Station, Units 1 and 2**

**Facility Operating License Nos. NPF-37 and NPF-66**

**REVISED TECHNICAL SPECIFICATIONS BASES PAGE**

B 3.4.12-9

BASES

LCO

This LCO requires that the LTOP System is OPERABLE. The LTOP System is OPERABLE when the minimum coolant input and pressure relief capabilities are OPERABLE. Violation of this LCO could lead to the loss of low temperature overpressure mitigation capability and violation of the Reference 1 limits as a result of an operational transient.

To limit the coolant input capability, the LCO requires no SI pumps and a maximum of one charging pump (centrifugal) be capable of injecting into the RCS, and all accumulator discharge isolation valves be closed and de-energized (when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed in the PTLR).

two notes. Note 1

The LCO is modified by ~~a note that~~ permits the operation in MODE 4 with all SI pumps and charging pumps capable of RCS injection whenever all RCS cold legs exceed 330°F. This is necessary to allow transition between MODES 3 and 4.

The elements of the LCO that provide low temperature overpressure mitigation through pressure relief are:

- a. Two OPERABLE PORVs;
- b. Two OPERABLE RHR suction relief valves;
- c. One OPERABLE PORV and one OPERABLE RHR suction relief valve; or
- d. A depressurized RCS and an OPERABLE RCS vent.

A PORV is OPERABLE for LTOP when its block valve is open, its lift setpoint is set to the limit required by the PTLR and testing proves its ability to open at this setpoint, and motive power is available to the two valves and their control circuits.

An RHR suction relief valve is OPERABLE for LTOP when its RHR suction isolation valves are open, its setpoint is  $\leq 450$  psig, and testing has proven its ability to open at this setpoint.

Note 2 permits operation in MODE 5 and in MODE 6 when the reactor vessel head is on with one or more SI pumps capable of RCS injection whenever pressurizer level is  $\leq 5$  percent. This is necessary to provide for the mitigation of the effects of a loss of decay heat removal cooling event during mid-loop operations. Operation of at least one SI pump is required in some instances to prevent core uncover.