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10 CFR 50.90

December 4, 2013

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

Peach Bottom Atomic Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-44 and DPR-56
NRC Docket Nos. 50-277 and 50-278

Subject: License Amendment Request to Remove LCO 3.5.1 Note

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 the Technical Specifications (TS) for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3, respectively.

The proposed amendment will revise Limiting Condition for Operation (LCO) 3.5.1 to remove a note that is not conservative. Attachment 1 provides a description of the proposed changes. Attachment 2 provides the existing TS pages marked up to show the proposed changes. Additionally, marked up TS Bases pages are provided in Attachment 3 for information only.

There are no regulatory commitments contained in this letter.

The proposed changes have been reviewed by the PBAPS Plant Operations Review Committee 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 amendment by December 4, 2014. Once approved, the amendment shall be implemented within 60 days of issuance.

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

If you have any questions or require additional information, please contact Stephanie J. Hanson at (610) 765-5143.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 4th day of December 2013.

Respectfully,

James Barstow
Director, Licensing and Regulatory Affairs
Exelon Generation Company, LLC

Attachments:

1. Evaluation of Proposed Changes
2. Markup of Technical Specifications Pages
3. Markup of Technical Specifications Bases Pages (For Information Only)

cc: USNRC Region I, Regional Administrator
USNRC Project Manager, PBAPS
USNRC Senior Resident Inspector, PBAPS
R. R. Janati, Bureau of Radiation Protection
S. T. Gray, State of Maryland

ATTACHMENT 1

Evaluation of Proposed Changes

Peach Bottom Atomic Power Station, Units 2 and 3

Renewed Facility Operating License Nos. DPR-44 and DPR-56

Docket Nos. 50-277 and 50-278

Subject: License Amendment Request to Remove LCO 3.5.1 Note

1.0 SUMMARY DESCRIPTION

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (EGC) is requesting an amendment to Renewed Facility Operating License Nos. DPR-44 and DPR-56 for Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3, respectively.

The proposed amendment will revise Limiting Condition for Operation (LCO) 3.5.1 to remove a Note that is not conservative.

2.0 DETAILED DESCRIPTION

The following proposed change to the PBAPS, Units 2 and 3, Technical Specifications (TS) is summarized below:

1. The Note under LCO 3.5.1, on TS Page 3.5-1, pertaining to allowing the LPCI subsystem to be operable when using shutdown cooling for decay heat removal in Mode 3 is being deleted in its entirety.

A markup of the proposed TS change is provided in Attachment 2. Additionally, marked up TS Bases pages for PBAPS, Units 2 and 3, respectively, are provided in Attachment 3 for information only.

3.0 TECHNICAL EVALUATION

As a result of an Operating Experience (OPEX) review of Sequoyah Nuclear Plant – NRC Integrated Inspection Report 05000327/2012002, 05000328/2012002 (Reference 1), it was identified that PBAPS may be susceptible to a similar condition as Sequoyah involving the potential for water hammer in the Residual Heat Removal (RHR) system if in the Shutdown Cooling (SDC) Mode of RHR in Mode 3 when swapping from the SDC to Low Pressure Coolant Injection (LPCI) mode of RHR. Currently, LCO 3.5.1 is modified by a note that states that LPCI subsystems may be considered OPERABLE during alignment and operation for decay heat removal (i.e., SDC) with reactor steam dome pressure less than the RHR shutdown cooling isolation pressure in Mode 3, if capable of being manually realigned and not otherwise inoperable.

The note had been added to the PBAPS TS as part of TS Amendment 259 and 262 for Units 2 and 3, respectively (Reference 2), which was approved on May 10, 2006. TSTF-416, Rev. 0, "Clarification of LPCI Operability during Decay Heat Removal Operations" (Reference 3) modified the Improved Standard Technical Specifications (ISTS) provided in NUREG-1433, Volume 1, "Standard Technical Specifications, General Electric BWR/4 Plants," (Reference 4) by moving the Note that modifies Low Pressure Coolant Injection (LPCI) surveillances to the LCO in LCO 3.5.1 and LCO 3.5.2. These notes were intended to provide clarity that LPCI may be considered OPERABLE during alignment and operation in the decay heat removal Mode.

An Engineering evaluation at PBAPS has determined that during operation in Mode 3 (hot shutdown), if a design basis loss of coolant accident (LOCA) occurred, the potential exists for the water in the suction piping for the Emergency Core Cooling System (ECCS) pumps previously aligned for decay heat removal to flash / boil and prevent the pumps from operating

properly. Due to the physical arrangement of the SDC and LPCI suction lines for the RHR pumps, high temperature water could flash when introduced into the low pressure suction lines. The threat is greatest at the beginning of Mode 3 when water temperature is at its highest. As such, precautions need to be taken to prevent flashing under these conditions. Actions were promptly put in place to not declare the LPCI mode operable (or attempt to use the LPCI mode) under these conditions, even though the Note for LCO 3.5.1 would allow operability. Therefore, removal of the note is appropriate.

As described in PBAPS Updated Final Safety Analysis Report (UFSAR) Section 4.8 (Reference 5), the safety objective of the RHR system is to restore and maintain the coolant inventory in the reactor vessel so that the core is adequately cooled after a LOCA (i.e., LPCI mode of RHR). The RHR system also provides cooling for the containment so that condensation of the steam resulting from the blowdown due to the design basis LOCA is ensured (i.e., Containment Cooling mode of RHR). In addition, the RHR system may be used in the SDC mode to remove residual heat from the nuclear system to maintain reactor water inventory below 212 degrees F so that refueling and nuclear system servicing can be performed.

The major equipment of the RHR system consists of four heat exchangers, four main system pumps, and four high-pressure service water (HPSW) pumps for each unit. The equipment is connected by associated valves and piping, and the controls and instrumentation are provided for proper system operation. The main system pumps are sized on the basis of the flow required during the LPCI mode of operation, which is the mode requiring the maximum flow rate. The heat exchangers are sized on the basis of their required duty for the containment cooling function.

The SDC mode of RHR uses the same piping discharge path as the LPCI mode of RHR. However, the SDC suction path is from one of the recirculation loops off the Reactor Pressure Vessel (RPV), while the LPCI suction path is from the Suppression Pool. One loop of RHR, consisting of two heat exchangers, two main system pumps in parallel, and associated piping, is located in one area of the Reactor Building. The other heat exchangers, pumps, and piping, forming a second loop, are located in another area of the Reactor Building to minimize the possibility of a single physical event causing the loss of the entire system. The RHR piping has an automatic fill system to ensure the lines are filled with water.

There are two RHR shutdown cooling subsystems per RHR system loop. Both loops have a common suction from the same recirculation loop. The four redundant, manually controlled shutdown cooling subsystems of the RHR system provide decay heat removal. Each pump discharges the reactor coolant, after circulation through the respective heat exchanger, to the reactor via the associated recirculation loop. The RHR heat exchangers transfer heat to the HPSW system. Any one of the four RHR shutdown cooling subsystems can provide the required decay heat removal function. Decay heat removal by operation of the RHR system in the shutdown cooling mode is not required for mitigation of any event or accident evaluated in the safety analyses. Decay heat removal is, however, an important safety function that must be accomplished or core damage could result.

The shutdown cooling subsystem is an integral part of the RHR system and is placed in operation during shutdown and cooldown, as required by TS Section 3.4.7, RHR Shutdown Cooling System – Hot Shutdown. The initial phase of nuclear system cooldown is accomplished by dumping steam from the reactor vessel to the main condenser, with the main condenser acting as the heat sink. When nuclear system temperature has decreased to a point where the steam supply pressure is not sufficient to maintain the turbine shaft gland seals, vacuum in the

main condenser cannot be maintained and the RHR system is placed in the shutdown cooling mode of operation. The shutdown cooling subsystem is capable of completing cooldown to 125 degrees F in approximately 30 hours, and of maintaining the nuclear system at or less than 125 degrees F so that the reactor can be refueled and serviced. Reactor coolant is pumped by the RHR main system pumps from one of the recirculation loops through the RHR heat exchangers, where cooling takes place by transferring heat to HPSW. Reactor coolant is returned to the reactor vessel via either recirculation loop. During a nuclear system shutdown and cooldown, when the shutdown cooling subsystem is initially placed in operation, decay heat levels can be high and operation of more than one RHR system heat exchanger may be required to remove the heat. When the decay heat level has decreased sufficiently, the entire shutdown cooling load can be shifted to one RHR system heat exchanger, leaving the other available for any other cooling loads.

PBAPS TS Section 3.4.7, RHR Shutdown Cooling System – Hot Shutdown requires that two RHR SDC subsystems be operable, and with no recirculation pump in operation, at least one RHR SDC subsystem shall be in operation. TS Section 3.4.7 is only applicable in Mode 3, with reactor steam dome pressure less than the RHR SDC isolation pressure required by TS Section 3.3.6.1. Mode 3 means that the reactor mode switch is in the 'Shutdown' position and the average reactor coolant temperature is greater than 212 degrees F. In this mode, all the reactor vessel head closure bolts are fully tensioned and therefore, reactor pressure would typically exist. Irradiated fuel in the shutdown reactor core generates heat during the decay of fission products and increases the temperature of the reactor coolant. This decay heat must be removed to reduce the temperature of the reactor coolant to less than or equal to 212 degrees F. This decay heat removal is in preparation for performing refueling or maintenance operations, or for keeping the reactor in the Hot Shutdown condition.

In Mode 3, the LPCI mode of RHR is also required to be operable in accordance with TS Section 3.5.1, Emergency Core Cooling Systems (ECCS) - Operating. TS Section 3.5.1 requires both LPCI subsystems to be operable. There are two LPCI subsystems, each consisting of two motor driven pumps and piping and valves to transfer water from the suppression pool to the RPV via the corresponding recirculation loop. The LPCI subsystems are designed to provide core cooling at low RPV pressure. Upon receipt of an initiation signal, all four LPCI pumps are automatically started. RHR system valves in the LPCI flow path are automatically positioned to ensure the proper flow path for water from the suppression pool to inject into the recirculation loops. When the RPV pressure drops sufficiently, the LPCI flow to the RPV, via the corresponding recirculation loop, begins.

LCO 3.5.1 contains a note to facilitate maintaining the LPCI modes of RHR operable while using the SDC mode of RHR. The note states that LPCI subsystems may be considered OPERABLE during alignment and operation for decay heat removal when below the actual RHR shutdown cooling isolation pressure in MODE 3, if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable. Alignment and operation for decay heat removal includes when the required RHR pump is not operating or when the system is realigned from or to the RHR shutdown cooling mode. This allowance is necessary since the RHR system may be required to operate in the SDC mode to remove decay heat and sensible heat from the reactor. At these low pressures and decay heat levels, a reduced complement of ECCS subsystems should provide the required core cooling, thereby allowing operation of RHR shutdown cooling when necessary.

However, as a result of industry operating experience concerning the potential for RHR pump cavitation at higher temperatures when below the SDC high pressure isolation setpoint of 70 psig in Mode 3, there exists a possibility that if an RHR subsystem is aligned for SDC at

pressures below 70 psig, then water with a temperature of up to 316 degrees F (i.e., the saturation temperature at 70 psig) would be introduced into the suction piping of the RHR system when the SDC isolation valves are opened. This would not represent a problem in the SDC mode of RHR due to the significantly elevated suction head pressure (i.e., RPV water head combined with the steam pressure in the reactor vessel). However, if the RHR system needs to be re-aligned to the LPCI mode, then the suction source would transfer to the Suppression Pool, which would have a significantly lower suction head pressure. This lower suction head pressure combined with the elevated temperature of the water in the suction piping associated with the RHR pump could result in cavitation of the pump and voiding in the suction piping, resulting in the potential to damage the RHR system, including water hammer.

Therefore, the LCO 3.5.1 Note is not appropriate and should be removed from the PBAPS TS.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements / Criteria

10 CFR 50.36, "Technical specifications," details the information that must be included in each station's TS. The purpose of this amendment request is to remove a LCO Note that is not conservative. The proposed change has no impact on current Safety Limits, Limiting Safety System Settings, Limiting Control Settings, Limiting Conditions for Operation, Surveillance Requirements, Design Features, or Administrative Controls. Therefore, EGC concludes that the methods used to comply with 10 CFR 50.36 are not modified by the proposed change, and the requirements continue to be met.

The proposed change does not involve any physical changes to the structures, systems, or components (SSCs) in the plant or the way the SCCs are operated or controlled.

4.2 Precedent

None

4.3 No Significant Hazards Consideration

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (EGC) is requesting an amendment to Renewed Facility Operating License Nos. DPR-44 and DPR-56 for Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3, respectively.

The proposed amendment will revise LCO 3.5.1 to remove a note that is not conservative.

EGC has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

   Response: No.

No physical changes to the facility will occur as a result of this proposed amendment. The proposed change will not alter the physical design. Current TSs could make PBAPS susceptible to potential water hammer in the RHR system if in the SDC Mode of RHR in Mode 3 when swapping from the SDC to LPCI mode of RHR. The proposed LAR will eliminate the risk for cavitation of the pump and voiding in the suction piping, thereby avoiding potential to damage the RHR system, including water hammer.

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 does not alter the physical design, safety limits, or safety analysis assumptions associated with the operation of the plant. Accordingly, the change does not introduce any new accident initiators, nor does it reduce or adversely affect the capabilities of any plant structure, system, or component to perform their safety function. Deletion of the TS Note is appropriate because current TSs could put the plant at risk for potential cavitation of the pump and voiding in the suction piping, resulting in potential to damage the RHR system, including water hammer.

   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 conforms to NRC regulatory guidance regarding the content of plant Technical Specifications. The proposed change does not alter the physical design, safety limits, or safety analysis assumptions associated with the operation of the plant.

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

Based on the above, EGC concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of no significant hazards consideration is justified.

4.4 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.

5.0 ENVIRONMENTAL CONSIDERATION

The proposed amendment is confined to (i) changes to surety, insurance, and/or indemnity requirements; (ii) changes to recordkeeping, reporting, or administrative procedures or requirements; (iii) changes to the licensee's or permit holder's name, phone number, business or e-mail address; (iv) changes to the name, position, or title of an officer of the licensee or permit holder, including but not limited to, the radiation safety officer or quality assurance manager; or (v) changes to the format of the license or permit or otherwise makes editorial, corrective or other minor revisions, including the updating of NRC approved references. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(10). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. Sequoyah Nuclear Plant - NRC Integrated Inspection Report 05000327/2012002, 05000328/2012002 dated April 30, 2012.

2. Letter from R. V. Guzman, U. S. Nuclear Regulatory Commission to C. M. Crane, Exelon Generation Corporation LLC, [Issuance of Amendment No. 259 and 262, for Peach Bottom Atomic Power Station, Units 2 and 3] dated May 10, 2006.

3. TSTF-416, "Clarification of LPCI Operability during Decay Heat Removal Operations," Revision 0, dated August 4, 2003.

4. U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, NUREG-1433, Revision 4, "Standard Technical Specifications - General Electric BWR/4 Plants," dated April 2012.

5. Peach Bottom Atomic Power Station, Updated Final Safety Analysis, Revision 24.

ATTACHMENT 2

Markup of Technical Specifications Pages

Peach Bottom Atomic Power Station Units 2 and 3

Renewed Facility Operating License Nos. DPR-44 and DPR-56

Docket Nos. 50-277 and 50-278

REVISED TECHNICAL SPECIFICATIONS PAGES

Unit 2 TS Page
3.5-1

Unit 3 TS Page
3.5-1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.1 ECCS—Operating

LCO 3.5.1 Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of five safety/relief valves shall be OPERABLE.

DELETE

~~NOTE~~
~~Low pressure coolant injection (LPCI) subsystems may be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the Residual Heat Removal (RHR) shutdown cooling isolation pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable.~~

APPLICABILITY: MODE 1,
MODES 2 and 3, except high pressure coolant injection (HPCI) is not required to be OPERABLE with reactor steam dome pressure ≤ 150 psig and ADS valves are not required to be OPERABLE with reactor steam dome pressure ≤ 100 psig.

ACTIONS

NOTE
LCO 3.0.4.b is not applicable to HPCI.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One low pressure ECCS injection/spray subsystem inoperable. OR One low pressure coolant injection (LPCI) pump in each subsystem inoperable.	A.1 Restore low pressure ECCS injection/spray subsystem(s) to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	12 hours

(continued)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.1 ECCS—Operating

LCO 3.5.1 Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of five safety/relief valves shall be OPERABLE.

DELETE

~~NOTE~~
~~Low pressure coolant injection (LPCI) subsystems may be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the Residual Heat Removal (RHR) shutdown cooling isolation pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable.~~

APPLICABILITY: MODE 1,
MODES 2 and 3, except high pressure coolant injection (HPCI) is not required to be OPERABLE with reactor steam dome pressure ≤ 150 psig and ADS valves are not required to be OPERABLE with reactor steam dome pressure ≤ 100 psig.

ACTIONS

NOTE
LCO 3.0.4.b is not applicable to HPCI.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One low pressure ECCS injection/spray subsystem inoperable. <u>OR</u> One low pressure coolant injection (LPCI) pump in each subsystem inoperable.	A.1 Restore low pressure ECCS injection/spray subsystem(s) to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	12 hours

(continued)

ATTACHMENT 3

Markup of Technical Specifications Bases Pages (For Information Only)

Peach Bottom Atomic Power Station Units 2 and 3

Renewed Facility Operating License Nos. DPR-44 and DPR-56

Docket Nos. 50-277 and 50-278

REVISED TECHNICAL SPECIFICATIONS BASES PAGES

Unit 2 TS Bases Page
B 3.5-5
B 3.5-6

Unit 3 TS Bases Page
B 3.5-5
B 3.5-6

BASES

APPLICABLE SAFETY ANALYSES (continued)

This LCO helps to ensure that the following acceptance criteria for the ECCS, established by 10 CFR 50.46 (Ref. 8), will be met following a LOCA, assuming the worst case single active component failure in the ECCS:

a. Maximum fuel element cladding temperature is ≤ 2200°F;

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation;

c. Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount that would be generated if all of the metal in the cladding surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react;

d. The core is maintained in a coolable geometry; and

e. Adequate long term cooling capability is maintained.

The limiting single failures are discussed in References 7, 14, and 15. The remaining OPERABLE ECCS subsystems provide the capability to adequately cool the core and prevent excessive fuel damage.

The ECCS satisfy Criterion 3 of the NRC Policy Statement.

LCO

Each ECCS injection/spray subsystem and five ADS valves are required to be OPERABLE. The ECCS injection/spray subsystems are defined as the two CS subsystems, the two LPCI subsystems, and one HPCI System. The low pressure ECCS injection/spray subsystems are defined as the two CS subsystems and the two LPCI subsystems.

With less than the required number of ECCS subsystems OPERABLE, the potential exists that during a limiting design basis LOCA concurrent with the worst case single failure, the limits specified in Reference 8 could be exceeded. All ECCS subsystems must therefore be OPERABLE to satisfy the single failure criterion required by Reference 8.

A is inoperable

~~As noted,~~ LPCI subsystems ~~may be~~ considered ~~OPERABLE~~ during alignment and operation for decay heat removal when below the actual RHR shutdown cooling isolation pressure in MODE 3, ~~if capable of being manually realigned (remote or local) to the~~

DELETE

DELETE

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since transferring from the shutdown cooling mode to the LPCI mode could result in pump cavitation and voiding in the suction piping, resulting in the potential to damage the RHR System, including water hammer.

BASES

LCO (continued)

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~~LPCI mode and not otherwise inoperable. Alignment and operation for decay heat removal includes when the required RHR pump is not operating or when the system is realigned from or to the RHR shutdown cooling mode. This allowance is necessary since the RHR System may be required to operate in the shutdown cooling mode to remove decay heat and sensible~~ heat from the reactor. At these low pressures and ~~decay~~ is heat levels, a reduced complement of ECCS subsystems should provide the required core cooling, thereby allowing operation of RHR shutdown cooling when necessary. One LPCI subsystem shall be declared inoperable when MO-34A(B) and MO-39A(B) are simultaneously open in the same subsystem (one or both subsystems) with no Emergency Diesel Generators (EDGs) declared inoperable to ensure compliance to References 7, 14, and 15 single failure analyses (Ref. 11).

If the MO-34A and MO-39A are simultaneously open, the 'A' subsystem of LPCI shall be declared inoperable unless the E-1, E-2, or E-4 EDG is declared inoperable. If the MO-34B and MO-39B are simultaneously open, the 'B' subsystem of LPCI shall be declared inoperable unless the E-1, E-2, or E-3 EDG is declared inoperable.

APPLICABILITY

All ECCS subsystems are required to be OPERABLE during MODES 1, 2, and 3, when there is considerable energy in the reactor core and core cooling would be required to prevent fuel damage in the event of a break in the primary system piping. In MODES 2 and 3, when reactor steam dome pressure is ≤ 150 psig, HPCI is not required to be OPERABLE because the low pressure ECCS subsystems can provide sufficient flow below this pressure. In MODES 2 and 3, when reactor steam dome pressure is ≤ 100 psig, ADS is not required to be OPERABLE because the low pressure ECCS subsystems can provide sufficient flow below this pressure. ECCS requirements for MODES 4 and 5 are specified in LCO 3.5.2, "ECCS—Shutdown."

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable HPCI subsystem. There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an inoperable HPCI subsystem and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

This LCO helps to ensure that the following acceptance criteria for the ECCS, established by 10 CFR 50.46 (Ref. 8), will be met following a LOCA, assuming the worst case single active component failure in the ECCS:

a. Maximum fuel element cladding temperature is ≤ 2200°F;

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation;

c. Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount that would be generated if all of the metal in the cladding surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react;

d. The core is maintained in a coolable geometry; and

e. Adequate long term cooling capability is maintained.

The limiting single failures are discussed in References 7, 14, and 15. The remaining OPERABLE ECCS subsystems provide the capability to adequately cool the core and prevent excessive fuel damage.

The ECCS satisfy Criterion 3 of the NRC Policy Statement.

LCO

Each ECCS injection/spray subsystem and five ADS valves are required to be OPERABLE. The ECCS injection/spray subsystems are defined as the two CS subsystems, the two LPCI subsystems, and one HPCI System. The low pressure ECCS injection/spray subsystems are defined as the two CS subsystems and the two LPCI subsystems.

With less than the required number of ECCS subsystems OPERABLE, the potential exists that during a limiting design basis LOCA concurrent with the worst case single failure, the limits specified in Reference 8 could be exceeded. All ECCS subsystems must therefore be OPERABLE to satisfy the single failure criterion required by Reference 8.

DELETE ~~As noted,~~ A LPCI subsystems ~~may be~~ is considered ~~OPERABLE~~ inoperable during alignment and operation for decay heat removal when below the actual RHR shutdown cooling isolation pressure in MODE 3, ~~if~~

DELETE ~~capable of being manually realigned (remote or local) to the~~

since transferring from the shutdown cooling mode to the LPCI mode could result in pump cavitation and voiding in the suction piping, resulting in the potential to damage the RHR System, including water hammer.

(continued)

BASES

LCO (continued)

DELETE

~~LPCI mode and not otherwise inoperable. Alignment and operation for decay heat removal includes when the required RHR pump is not operating or when the system is realigned from or to the RHR shutdown cooling mode.~~ This ~~allowance~~ is necessary since the RHR System ~~may be~~ required to operate in the shutdown cooling mode to remove decay ~~heat~~ and sensible heat from the reactor. At these low pressures and ~~decay~~ is heat levels, a reduced complement of ECCS subsystems should provide the required core cooling, thereby allowing operation of RHR shutdown cooling when necessary. One LPCI subsystem shall be declared inoperable when MO-34A(B) and MO-39A(B) are simultaneously open in the same subsystem (one or both subsystems) with no Emergency Diesel Generators (EDGs) declared inoperable to ensure compliance to References 7, 14, and 15 single failure analyses (Ref. 11).

If the MO-34A and MO-39A are simultaneously open, the 'A' subsystem of LPCI shall be declared inoperable unless the E-1, E-2, or E-4 EDG is declared inoperable. If the MO-34B and MO-39B are simultaneously open, the 'B' subsystem of LPCI shall be declared inoperable unless the E-1, E-2, or E-3 EDG is declared inoperable.

APPLICABILITY

All ECCS subsystems are required to be OPERABLE during MODES 1, 2, and 3, when there is considerable energy in the reactor core and core cooling would be required to prevent fuel damage in the event of a break in the primary system piping. In MODES 2 and 3, when reactor steam dome pressure is ≤ 150 psig, HPCI is not required to be OPERABLE because the low pressure ECCS subsystems can provide sufficient flow below this pressure. In MODES 2 and 3, when reactor steam dome pressure is ≤ 100 psig, ADS is not required to be OPERABLE because the low pressure ECCS subsystems can provide sufficient flow below this pressure. ECCS requirements for MODES 4 and 5 are specified in LCO 3.5.2, "ECCS—Shutdown."

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable HPCI subsystem. There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an inoperable HPCI subsystem and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

(continued)