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RS-17-017

10 CFR 50.90

May 4, 2017

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

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: License Amendment Request to Clarify RHR Subsystem Operability Requirements during Decay Heat Removal Operations

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 Appendix A, Technical Specifications (TS) of Facility Operating License (FOL) No. NPF-62 for Clinton Power Station (CPS), Unit 1. The proposed amendment would delete a Surveillance Requirement (SR) Note associated with TS 3.5.1, "ECCS – Operating," TS 3.5.2, "ECCS – Shutdown," and TS 3.6.1.7, "Residual Heat Removal (RHR) Containment Spray System," to more appropriately reflect the Residual Heat Removal (RHR) system design, and ensure the RHR system operation is consistent with the TS Limiting Condition for Operation (LCO) requirements.

The proposed amendment would also insert a Note in the LCO for TS 3.5.1, TS 3.5.2, TS 3.6.1.7, TS 3.6.1.9, "Feedwater Leakage Control System," and TS 3.6.2.3, "Residual Heat Removal (RHR) Suppression Pool Cooling," to clarify that one of the required subsystems in each of the affected TS sections listed above may be inoperable during alignment and operation of the RHR system for Shutdown Cooling (i.e., decay heat removal) with the reactor steam dome pressure less than the RHR cut in permissive value.

These added Notes are based on a similar footnote that was inadvertently deleted from the original CPS TS 3.5.1 during conversion of the CPS TS to the Improved Technical Specifications (ITS). The incorporation of the original footnote was previously approved by the NRC for CPS with issuance of NUREG-0853, "Safety Evaluation Report related to the operation of Clinton Power Station, Unit No. 1, Docket 50-461."

These proposed changes will resolve a U.S. Nuclear Regulatory Commission (NRC) finding and associated Non-Cited Violation (NCV) that was identified during a Component Design Basis Inspection (CDBI) at CPS in 2016. This finding and associated NCV are documented in NRC Inspection Report 05000461/2016009. When identified by the NRC during the CDBI, EGC entered the issue into the CPS Corrective Action Program (CAP).

In addition, by letter dated May 1, 2017, EGC submitted a proposed amendment to FOL No. NFP-62 which requested approval to implement Technical Specification Task Force (TSTF)-542, "Reactor Pressure Vessel Water Inventory Control" for CPS (i.e., ADAMS Accession No. ML17121A517). The TSTF-542 license amendment request (LAR) affects two TS pages that are also affected by this proposed LAR. However, both this LAR and the TSTF-542 LAR are independent of each other.

The attached amendment request is subdivided as follows:

- Attachment 1 provides a description and evaluation of the proposed changes.
- Attachment 2 provides the marked-up TS pages with the proposed change indicated.
- Attachment 3 provides the marked-up TS Bases pages with the proposed change indicated. The TS Bases pages are provided for information only and do not require NRC approval.
- Attachment 4 provides a mark-up of the affected TS pages that were submitted in the May 1, 2017 LAR (i.e., TSTF-542 changes).

The proposed amendment has been reviewed by the CPS Plant Operations Review Committee in accordance with the requirements of the EGC Quality Assurance Program.

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 of Illinois official.

EGC requests approval of the proposed license amendment by May 4, 2018. Once approved, the amendment will be implemented within 60 days of issuance.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this letter, please contact Mr. John L. Schrage at (630) 657-2821.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 4th day of May 2017.

Respectfully,

Patrick R. Simpson
Manager – Licensing
Exelon Generation Company, LLC

Attachments:

1. Evaluation of Proposed Change
2. Proposed Technical Specifications Changes for Clinton Power Station, Unit 1
3. Proposed Technical Specifications Bases Changes for Clinton Power Station, Unit 1
4. Proposed Technical Specifications Changes for Clinton Power Station, Unit 1 Relative to May 1, 2017 License Amendment Request to Implement Technical Specification Task Force Traveler-542

cc: NRC Regional Administrator, Region III
NRC Senior Resident Inspector, Clinton Power Station, Unit 1
Illinois Emergency Management Agency – Division of Nuclear Safety

ATTACHMENT 1
Evaluation of Proposed Change

Subject: License Amendment Request to Clarify RHR Subsystem Operability Requirements during Decay Heat Removal Operations

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) is requesting to amend Appendix A, Technical Specifications (TS) of Facility Operating License (FOL) No. NPF-62 for Clinton Power Station (CPS), Unit 1. EGC proposes to delete a Surveillance Requirement (SR) Note associated with TS 3.5.1, "ECCS – Operating," TS 3.5.2, "ECCS – Shutdown," and TS 3.6.1.7, "Residual Heat Removal (RHR) Containment Spray System," to more appropriately reflect the Residual Heat Removal (RHR) system design, and ensure the RHR system operation is consistent with the TS Limiting Condition for Operation (LCO) requirements.

EGC also proposes to insert a Note in the LCO for TS 3.5.1, 3.5.2, TS 3.6.1.7, TS 3.6.1.9, "Feedwater Leakage Control System," and TS 3.6.2.3, "Residual Heat Removal (RHR) Suppression Pool Cooling," to clarify that one subsystem in each of the affected TS sections listed above may be inoperable during alignment and operation of the RHR system for decay heat removal, with the reactor steam dome pressure less than the RHR cut in permissive value. These added Notes are based on a similar footnote that was inadvertently deleted from the original CPS TS 3.5.1 during conversion of the CPS TS to the Improved Technical Specifications (ITS). The incorporation of the original footnote was previously approved by the NRC for CPS with issuance of NUREG-0853, "Safety Evaluation Report related to the operation of Clinton Power Station, Unit No. 1, Docket 50-461."

These proposed changes will resolve a U.S. Nuclear Regulatory Commission (NRC) finding and associated Non-Cited Violation (NCV) that was identified during a Component Design Basis Inspection (CDBI) at CPS in 2016. This finding and associated NCV are documented in NRC Inspection Report 05000461/2016009 (Reference 1). When identified by the NRC during the CDBI, EGC entered the issue into the Corrective Action Program (CAP).

In addition, by letter dated May 1, 2017, EGC submitted a proposed amendment to FOL No. NFP-62 which requested approval to implement Technical Specification Task Force (TSTF)-542, "Reactor Pressure Vessel Water Inventory Control" for CPS (i.e., ADAMS Accession No. ML17121A517). The TSTF-542 license amendment request (LAR) affects two TS pages that are also affected by this proposed LAR. However, both this LAR and the TSTF-542 LAR are independent of each other. Attachment 4 provides a mark-up of the two affected TS pages that were submitted in the May 1, 2017 LAR (i.e., TSTF-542 changes).

2.0 DETAILED DESCRIPTION

The proposed change will delete the following Note 1 from SR 3.5.1.2 and renumber the existing Note 2:

> 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 cut in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable.

The proposed change will delete the following Note 1 from SR 3.5.2.4 and renumber the existing Note 2:

> One low pressure coolant injection (LPCI) subsystem may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned and not otherwise inoperable.

The proposed change will delete the following Note 1 from SR 3.6.1.7.1 and renumber the existing Note 2:

> RHR containment spray subsystems may be considered OPERABLE during alignment and operation for decay heat removal when below the RHR cut in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable.

The proposed change will add the following Note to LCO 3.5.1:

> One low pressure coolant injection (LPCI) subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.

The proposed change will add the following Note to LCO 3.5.2:

> One low pressure coolant injection (LPCI) subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.

The proposed change will add the following Note to LCO 3.6.1.7:

> One RHR containment spray subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.

The proposed change will add the following Note to LCO 3.6.1.9:

> One FWLCS subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.

The proposed change will add the following Note to LCO 3.6.2.3:

> One RHR suppression pool cooling subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.

Attachment 2 provides the marked-up TS pages with the proposed changes indicated. Attachment 3 provides marked-up TS Bases pages with the proposed change indicated for CPS and is provided for information only. Attachment 4 provides a mark-up of the two affected TS pages that were previously submitted in an LAR dated May 1, 2017 LAR (i.e., TSTF-542 changes) (ADAMS Accession No. ML17121A517).

3.0 TECHNICAL EVALUATION

RHR System Design and Operation

The CPS RHR system is designed to perform different and independent functions to support plant operation during normal and accident conditions:

- Shutdown cooling (SDC)
- LPCI
- Suppression pool cooling
- RHR containment spray cooling
- Feedwater leakage control (FWLC)

The RHR system consists of three independent closed loops (i.e., A, B, and C), each containing a motor driven pump, powered by an Engineered Safety Feature (ESF) bus, and associated piping, valves, instrumentation and controls. Two of the independent RHR loops contain a heat exchanger with associated service water supply system to support the heat removal functions. The RHR pumps are sized on the basis of the flow required during the LPCI mode of operation. The heat exchangers are sized on the basis of required duty for the SDC mode.

The SDC mode is operated during normal unit cooldown and shutdown to remove decay heat. This decay heat removal is required for performing refueling or maintenance operations, or for keeping the reactor in the MODE 3 (i.e., Hot Shutdown) condition. In the SDC mode of operation, either the A or B RHR pump takes suction from the B Reactor Recirculation (RR) loop; and directs the flow through the RHR heat exchanger prior to returning the water back to the RPV through the feedwater header.

The LPCI mode supports the emergency core cooling system (ECCS) safety objective to limit the release of radioactive materials following a loss of coolant accident (LOCA) by delivering a large flood of water into the core to refill the reactor pressure vessel (RPV) and provide core cooling at low RPV pressures. The three RHR pumps automatically start in LPCI mode upon receipt of an ECCS initiation signal. In the LPCI mode of operation, each RHR pump takes suction from the suppression pool through an independent suction line and discharges to the reactor core through separate RPV piping penetrations.

The RHR suppression pool cooling mode limits the long-term bulk temperature of the suppression pool without spray operation when considering the energy additions to the containment following a LOCA. The two RHR suppression pool cooling subsystems perform the suppression pool cooling function by circulating water from the suppression pool through the RHR heat exchangers and returning it to the suppression pool. Each RHR suppression pool

cooling subsystem contains a pump and one heat exchanger and is manually initiated and independently controlled.

The RHR containment spray cooling mode provides two redundant means to spray into the containment and suppression pool vapor space to reduce internal pressure to below design limits with bypass leakage from all leakage paths from drywell to containment. There are two redundant, 100% capacity RHR containment spray subsystems. Each subsystem consists of a suction line from the suppression pool, an RHR pump, a heat exchanger, and two spray headers inside the primary containment. The RHR containment spray mode will be automatically initiated, if required, following a LOCA.

The FWLCS mode of RHR supplements the isolation function of primary containment isolation valves (PCIVs) in the feedwater lines which also penetrate the secondary containment. These penetrations are sealed by water from the FWLCS to prevent fission products (i.e., post-LOCA containment atmosphere) from leaking past the isolation valves and bypassing the secondary containment after a LOCA. The subsystem is designed to divert flow from the RHR, LPCI, RHR suppression pool cooling, and RHR containment spray modes without reducing flows in those modes below the functional design bases. The FWLCS consists of two independent, manually initiated subsystems. Each subsystem uses its connected train of the RHR system and a header to provide sealing water for pressurizing the feedwater piping.

TS Requirements

CPS TS 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System – Hot Shutdown," LCO states that during MODE 3 with reactor steam dome pressure less than the RHR cut in permissive pressure, two RHR SDC subsystems are required to be OPERABLE, and when no Reactor Recirculation pump is in operation, one SDC subsystem must be in operation.

An OPERABLE RHR SDC subsystem consists of one RHR pump, one heat exchanger, and the associated piping and valves. Each SDC subsystem is considered OPERABLE if it can be manually aligned (remote or local) to the SDC mode for removal of decay heat. If one or both SDC subsystems are inoperable, TS 3.4.9, Condition A, requires immediate initiation of actions to restore one SDC subsystem to OPERABLE status and verify an alternate method of decay heat removal is available for each inoperable RHR SDC subsystem.

CPS TS 3.5.1 requires each ECCS injection system to be OPERABLE in MODEs 1, 2, and 3. With respect to LPCI, this means that all three LPCI subsystems are required to be OPERABLE to ensure compliance with the LCO. If one LPCI subsystem is inoperable, TS 3.5.1, Condition A requires the inoperable subsystem to be returned to OPERABLE status within seven days.

Thus, while operating in MODE 3 with reactor steam dome pressure less than the RHR cut in permissive pressure, the TS 3.5.1 LCO requirement conflicts with the TS 3.4.9 LCO requirement in that three loops of LPCI are required to be OPERABLE, at the same time that two loops of SDC are required to be OPERABLE.

Given this inconsistency, CPS SR 3.5.1.2 is modified by a note that allows a LPCI subsystem to be considered OPERABLE for the LPCI function when the subsystem is being aligned or is operating in the SDC mode, and the unit is in MODE 3 below the RHR cut in permissive

pressure. Utilization of this note requires that the RHR system be capable of manual realignment to the LPCI mode and not be otherwise inoperable.

CPS TS 3.5.2 requires two ECCS injection/spray subsystems to be OPERABLE in MODEs 4 and 5. SR 3.5.2.4 is modified by the same note, with the exception that the note only allows one LPCI subsystem to be considered OPERABLE under the same conditions. Utilization of this note requires that the RHR system be capable of manual realignment to the LPCI mode and not be otherwise inoperable.

CPS TS 3.6.1.7 requires two RHR containment spray subsystems to be OPERABLE in MODEs 1, 2, and 3. SR 3.6.1.7 is also modified by a similar note that allows the RHR containment spray subsystems to be considered OPERABLE when the subsystem is being aligned or is operating in the SDC mode, and the unit is in MODE 3 below the RHR cut in permissive pressure. Utilization of this note requires that the RHR system be capable of manual realignment and not otherwise inoperable.

These notes were added to SR 3.5.1.2, SR 3.5.2.4, and SR 3.6.1.7 during conversion of the CPS TS to the Improved Technical Specifications (ITS) (i.e., NUREG-1434, Standard Technical Specifications, General Electric BWR/6 Plants) as part of Amendment 95 to CPS FOL 62, which the NRC approved on December 2, 1994 (ADAMS Accession No. ML021000089). As stated in the NUREG-1434 Bases, these notes are 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 heat levels, a reduced complement of ECCS subsystems should provide the required core cooling, thereby allowing operation of RHR shutdown cooling when necessary.

Need for Proposed Changes

During an NRC CDBI at CPS in 2016, NRC inspectors identified a Non-cited Violation in that the design and operation of the RHR system was not consistent with TS requirements. This was documented in Reference 1. The RHR system could not support the TS operability of LPCI, RHR suppression pool cooling, RHR containment spray, and the FWLC subsystems in MODE 3 while an RHR subsystem was operating in SDC mode, as required by the associated TS LCOs and SR Notes described above. Under the stated operating conditions, these LCOs are not met because the suppression pool suction valves (i.e., valves 1E12-F004A(B)) are closed, and would not be able to be manually realigned from the SDC mode to support the other LCO functions (i.e., as required by the associated SR Notes). Specifically, these valves would not be capable of opening at water temperatures greater than 150°F due to pressure locking/thermal binding concerns. In addition, in this operating configuration, the potential exists for the water in the RHR pump suction piping, when aligned to SDC, to flash/boil when realigned to the ECCS modes. The resultant flashing/boiling of the high pressure, high temperature water when introduced to the low pressure piping could result in voiding in the suction piping, RHR pump cavitation, water hammer and associated RHR system damage.

Due to this inability to realign the suppression pool suction valves during SDC operation, the CPS operating procedure for RHR shutdown cooling directs operators to declare multiple TS LCOs not met when operating RHR in SDC with reactor water temperature greater than 150°F. These LCOs are LCO 3.5.1, LCO 3.5.2, LCO 3.6.1.7, LCO 3.6.1.9, and LCO 3.6.2.3.

Based on the RHR system design and the operational limitations described above, CPS will need to continue to declare the respective subsystems inoperable when an RHR subsystem is operating in SDC mode. However, as indicated in Reference 1, this practice is not consistent with the TS Basis for LCO 3.0.2 which states that intentional entry into ACTIONS should not be made for operational convenience. As such, the addition of the proposed Note to TS LCOs 3.5.1, 3.5.2, 3.6.1.7, 3.6.1.9, and 3.6.2.3 will establish consistency between the RHR system design and operation and the associated TS requirements.

Justification for Proposed Changes

Removal of Existing SR Note

The current procedural restrictions (i.e., declaring the LPCI, RHR suppression pool cooling, RHR containment spray, and the FWLC subsystems inoperable when configured for SDC mode of operation) are consistent with the 2010 EGC review of, and response to NRC Information Notice (IN) 2010-11, "Potential for Steam Voiding Causing Residual Heat Removal System Inoperability" (Reference 2) and operating experience at Prairie Island (i.e., Licensee Event Report (LER) 1-09-04 (Reference 3)). The EGC review of References 2 and 3 for CPS identified that during reactor operation in Mode 3, the potential exists for the water in the RHR pump suction piping, when aligned to SDC, to flash/boil when realigned to the ECCS modes. The resultant flashing/boiling of the high pressure, high temperature water, when introduced to the low pressure piping could result in voiding in the suction piping, RHR pump cavitation, water hammer and associated RHR system damage. The flashing/boiling in the RHR suction piping and suppression pool suction valve thermal binding are the result of the RHR system design that supports several different operating modes using common equipment.

Due to these operational constraints, the notes in CPS SR 3.5.1.2, SR 3.5.2.4, and SR 3.6.1.7 that allow LPCI and RHR containment spray subsystems to be considered OPERABLE when being aligned or operated in the SDC mode are inconsistent with system design and operation, and should be removed from the CPS TS. At the low pressures and decay heat levels in MODEs 3 and 4, with RPV pressure less than the RHR cut in permissive, a reduced complement of ECCS subsystems should provide the required core cooling; thereby, allowing operation of RHR shutdown cooling when necessary.

Addition of New LCO Note

The RHR system design and operation for CPS that is required by TS 3.4.9 (i.e., MODE 3 with an RHR subsystem operating in SDC) is consistent with the original CPS RHR system design. The NRC approved this design, as well as the original TS in NUREG-0853, "Safety Evaluation Report related to the operation of Clinton Power Station Unit 1." The original TS LCO for LPCI included a note that stated: "One LPCI subsystem of the RHR system may be aligned in the shutdown cooling mode when reactor vessel pressure is less than the LPCI cut in permissive setpoint."

As stated in NUREG-0853, the Standard Technical Specifications for BWR-4 and BWR-5 plants were used as the basis for the original CPS TS. The inclusion of this note in the original CPS TS 3.5.1 was consistent with the same note in NUREG-0123, "Standard Technical Specifications, General Electric BWR/5 Plants," Draft Revision 4:

> One LPCI subsystem of the RHR system may be inoperable in that it is aligned in the shutdown cooling mode when reactor vessel pressure is less than the RHR cut in permissive setpoint.

This note in the NUREG-0123 Standard Technical Specifications, as well as the original CPS TS explicitly resolved the inconsistency between the RHR system design and the original TS requirement which required both the LPCI and SDC modes of RHR to be concurrently OPERABLE with the RPV pressure less than the RHR cut in permissive setpoint. The proposed note will re-establish consistency of the CPS RHR system design with the original TS requirements.

With respect to the safety impact of the proposed note, CPS is a BWR/6 reactor type with three ECCS divisions. During operation in MODE 3 with the RPV pressure less than the RHR cut in permissive setpoint, the reactor has lower system pressure and temperature. In this operating configuration, one remaining ECCS pump can acceptably cool the core following a LOCA due to the remaining ECCS injection availability. The remaining ECCS would be either the High Pressure Core Spray (HPCS) system with a dedicated diesel generator power supply, the other division of RHR/LPCI with a dedicated diesel generator power supply, or the Low Pressure Core Spray System.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

The following NRC requirements and guidance documents are applicable to the review of the proposed changes.

10 CFR 50, Appendix A, General Design Criterion (GDC) 34, "Residual heat removal," requires that a system to remove residual heat be provided with a safety function to transfer fission product decay heat and other residual heat from the reactor core at a rate such that specified acceptable fuel design limits and the design conditions of the reactor coolant pressure boundary are not exceeded.

10 CFR 50, Appendix A, GDC 35, "Emergency core cooling," requires that a system to provide abundant emergency core cooling be provided with a safety function to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts.

10 CFR 10, Appendix A, GDC 37, "Testing of emergency core cooling system," requires that the emergency core cooling system design provide the capability for periodic pressure and functional testing. This testing shall assure (1) structural and leaktight integrity of components, (2) operability and performance of active components, (3) operability of the whole system under conditions as close to design as possible.

10 CFR 50.36, "Technical specifications," details the content and information that must be included in a station's Technical Specifications (TS). In accordance with 10 CFR 50.36, TS are required to include (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; and (5) administrative controls. As described in 10 CFR 50.36(c)(2), "Limiting conditions for operation," are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When an LCO is not met, the licensee shall shut down the reactor or follow any other actions permitted by TS.

10 CFR 50.46(a)(1)(i) requires that each boiling or pressurized light-water nuclear power reactor be provided with an ECCS designed with a calculated cooling performance in accordance with an acceptable evaluation model following a postulated LOCA.

The proposed change does not involve any physical changes to the structures, systems, or components at CPS. The proposed change will reflect current plant configuration of the RHR system design and assure safe operation by continuing to meet applicable regulations and requirements.

4.2 Precedents

The NRC has approved other LARs to remove the applicable Note from TS 3.5.1, as follows:

1. Letter from R. B. Ennis (U.S. NRC) to M. J. Pacilio (EGC), "Peach Bottom Atomic Power Station, Units 2 and 3 – Issuance of Amendments Re: Delete Non-Conservative Note from Limiting Condition for Operation for Operation 3.5.1 (TAC Nos. MF3184 and MF3185)," dated July 28, 2014 (ADAMS Accession No. ML14163A589)

2. Letter from B. K. Vaidya (U.S. NRC) to B. C. Hanson (EGC), "LaSalle County Station Units 1 and 2, Issuance of Amendments re: Revision of Technical Specifications Section 3.5.1, 'Emergency Core Cooling Systems Operating' (TAC Nos. MF5570 and MF 5571)," dated October 14, 2015 (ADAMS Accession No. ML15244B410)

4.3 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 No. NPF-62 for Clinton Power Station (CPS), Unit 1

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(c), "Issuance of amendment," as discussed below:

1. Does the proposed amendment 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 changes will not alter the physical design. The current TS (CTS) Note in SR 3.5.1.4, SR 3.5.2.4, and 3.6.1.7 could make CPS susceptible to potential water hammer in the RHR system while operating in the SDC mode of RHR in MODE 3 when swapping from the SDC to LPCI and RHR containment spray modes of RHR. Deletion of the Note from SR 3.5.1.2, SR 3.5.2.4, and SR 3.6.1.7.1 will eliminate the risk for cavitation of the pump and voiding in the suction piping, thereby avoiding the potential to damage the RHR system, including water hammer. The addition of proposed TS note to LCO 3.5.1, LCO 3.5.2, LCO 3.6.1.7, LCO 3.6.1.9, and LCO 3.6.2.3 will re-establish consistency of the CPS RHR system design with the original TS requirements.

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

2. Does the proposed amendment 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 Note from SR 3.5.1.2, SR 3.5.2.4, and SR 3.6.1.7.1 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. The addition of proposed TS note to LCO 3.5.1, LCO 3.5.2, LCO 3.6.1.7, LCO 3.6.1.9, and LCO 3.6.2.3 will re-establish consistency of the CPS RHR system design with the original TS requirements.

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

3. Does the proposed amendment 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 evaluation, 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 to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

EGC has evaluated the proposed amendment for environmental considerations. The review has resulted in the determination 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, or would change an inspection or surveillance requirement. 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(c)(9). 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. Letter from M. Jeffers (U. S. NRC) to B. C. Hanson (EGC), "Clinton Power Station – NRC Component Design Bases Inspection Report 05000461/2016009," dated January 12, 2017 (ADAMS Accession No. ML17013A253)

2. NRC Information Notice 2010-11, "Potential for Steam Voiding Causing Residual Heat Removal System Inoperability," dated June 16, 2010

3. Prairie Island Nuclear Generating Plant LER 1-09-04, "Residual Heat Removal System Inoperability While in MODE 4 Due to Potential Steam Voiding," dated June 5, 2009 (ADAMS Accession No. ML110100248)

ATTACHMENT 2
Proposed Technical Specifications Changes for Clinton Power Station, Unit 1

Clinton Power Station, Unit 1

Facility Operating License No. NPF-62

AFFECTED TECHNICAL SPECIFICATIONS PAGE

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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 seven safety/relief valves shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3, except ADS valves are not required to be OPERABLE with reactor steam dome pressure ≤ 150 psig.

ACTIONS

---NOTE---
LCO 3.0.4.b is not applicable to HPCS.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One low pressure ECCS injection/spray subsystem inoperable.	A.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	7 days
B. High Pressure Core Spray (HPCS) System inoperable.	B.1 Verify by administrative means RCIC System is OPERABLE when RCIC is required to be OPERABLE. AND B.2 Restore HPCS System to OPERABLE status.	1 hour 14 days

(continued)

---NOTE---
One low pressure coolant injection (LPCI) subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.5.1.1	Verify, for each ECCS injection/spray subsystem, locations susceptible to gas accumulation are sufficiently filled with water.	In accordance with the Surveillance Frequency Control Program
SR 3.5.1.2	----------NOTES---------- ~~1. 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 cut in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable.~~ ~~2.~~ Not required to be met for system vent flow paths opened under administrative control. ---------- Verify each ECCS injection/spray subsystem manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.5.1.3	Verify ADS accumulator supply pressure is ≥ 140 psig.	In accordance with the Surveillance Frequency Control Program
SR 3.5.1.4	Verify each ECCS pump develops the specified flow rate with the specified pump differential pressure. SYSTEM / FLOW RATE / PUMP DIFFERENTIAL PRESSURE LPCS: ≥ 5010 gpm: ≥ 290 psid LPCI: ≥ 5050 gpm: ≥ 113 psid HPCS: ≥ 5010 gpm: ≥ 363 psid	In accordance with the Inservice Testing Program

(continued)

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

3.5.2 ECCS—Shutdown

LCO 3.5.2 Two ECCS injection/spray subsystems shall be OPERABLE.

APPLICABILITY: MODE 4,
MODE 5 except with the reactor cavity to steam dryer pool gate removed and water level ≥ 22 ft 8 inches over the top of the reactor pressure vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required ECCS injection/spray subsystem inoperable.	A.1 Restore required ECCS injection/spray subsystem to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
C. Two required ECCS injection/spray subsystems inoperable.	C.1 Initiate action to suspend OPDRVs. AND C.2 Restore one ECCS injection/spray subsystem to OPERABLE status.	Immediately 4 hours

(continued)

----------NOTE----------
One low pressure coolant injection (LPCI) subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.5.2.1	Verify, for each required low pressure ECCS injection/spray subsystem, the suppression pool water level is ≥ 12 ft 8 inches.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.2	Verify, for the required High Pressure Core Spray (HPCS) System, the: a. Suppression pool water level is ≥ 12 ft 8 inches; or b. RCIC storage tank available water volume is ≥ 125,000 gal.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.3	Verify, for each required ECCS injection/spray subsystem, locations susceptible to gas accumulation are sufficiently filled with water.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.4	----------NOTES---------- ~~1. One low pressure coolant injection (LPCI) subsystem may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned and not otherwise inoperable.~~ ~~2.~~ Not required to be met for system vent flow paths opened under administrative control. ---------- Verify each required ECCS injection/spray subsystem manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program

(continued)

3.6 CONTAINMENT SYSTEMS

3.6.1.7 Residual Heat Removal (RHR) Containment Spray System

LCO 3.6.1.7 Two RHR containment spray subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RHR containment spray subsystem inoperable.	A.1 Restore RHR containment spray subsystem to OPERABLE status.	7 days
B. Two RHR containment spray subsystems inoperable.	B.1 Restore one RHR containment spray subsystem to OPERABLE status.	8 hours
C. Required Action and associated Completion Time not met.	----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- C.1 Be in MODE 3.	12 hours

----------NOTE----------
One RHR containment spray subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.6.1.7.1	----------NOTES---------- ~~1. RHR containment spray subsystems may be considered OPERABLE during alignment and operation for decay heat removal when below the RHR cut in permissive pressure in MODE 3 if capable of being manually realigned and not otherwise inoperable.~~ ~~2.~~ Not required to be met for system vent flow paths opened under administrative control. ---------- Verify each RHR containment spray subsystem manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.7.2	Verify each RHR pump develops a flow rate of ≥ 3800 gpm on recirculation flow through the associated heat exchanger to the suppression pool.	In accordance with the Inservice Testing Program
SR 3.6.1.7.3	Verify each RHR containment spray subsystem automatic valve in the flow path actuates to its correct position on an actual or simulated automatic initiation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.7.4	Verify each spray nozzle is unobstructed.	Following activities that could result in nozzle blockage
SR 3.6.1.7.5	Verify RHR containment spray subsystem locations susceptible to gas accumulation are sufficiently filled with water.	In accordance with the Surveillance Frequency Control Program

3.6 CONTAINMENT SYSTEMS

3.6.1.9 Feedwater Leakage Control System (FWLCS)

LCO 3.6.1.9 Two FWLCS subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One FWLCS subsystem inoperable.	A.1 Restore FWLCS subsystem to OPERABLE status.	30 days
B. Two FWLCS subsystems inoperable.	B.1 Restore one FWLCS subsystem to OPERABLE status.	7 days
C. Required Action and associated Completion Time not met.	----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- C.1 Be in MODE 3.	 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.6.1.9.1 Perform a system functional test of each FWLCS subsystem.	In accordance with the Surveillance Frequency Control Program

----------NOTE----------
One FWLCS subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.

3.6 CONTAINMENT SYSTEMS

3.6.2.3 Residual Heat Removal (RHR) Suppression Pool Cooling

LCO 3.6.2.3 Two RHR suppression pool cooling subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RHR suppression pool cooling subsystem inoperable.	A.1 Restore RHR suppression pool cooling subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met.	----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ----------	
	B.1 Be in MODE 3.	12 hours
C. Two RHR suppression pool cooling subsystems inoperable.	C.1 Be in MODE 3.	12 hours
	AND	
	C.2 Be in MODE 4.	36 hours

----------NOTE----------
One RHR suppression pool cooling subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.

ATTACHMENT 3
Proposed Technical Specifications Bases Changes for Clinton Power Station, Unit 1

Clinton Power Station, Unit 1

Facility Operating License No. NPF-62

AFFECTED TECHNICAL SPECIFICATIONS BASES PAGE
(NOTE: TS Bases pages are provided for information only.)

B 3.5 – 5
B 3.5 – 10a
B 3.5 – 15
B 3.5 – 16
B 3.5 – 20a
B 3.6 – 40
B 3.6 – 42
B 3.6 – 45
B 3.6 – 57

BASES (continued)

LCO

Each ECCS injection/spray subsystem and seven ADS valves are required to be OPERABLE. The ECCS injection/spray subsystems are the three LPCI subsystems, the LPCS System, and the HPCS System. The ECCS injection/spray subsystems are further subdivided into the following groups:

a) The low pressure ECCS injection/spray subsystems are the LPCS System and the three LPCI subsystems;

b) The ECCS injection subsystems are the three LPCI subsystems; and

c) The ECCS spray subsystems are the HPCS System and the LPCS System.

Management of gas voids is important to ECCS injection/spray subsystem OPERABILITY.

With less than the required number of ECCS subsystems OPERABLE during a limiting design basis LOCA concurrent with the worst case single failure, the limits specified in 10 CFR 50.46 (Ref. 10) could potentially be exceeded. All ECCS subsystems must therefore be OPERABLE to satisfy the single failure criterion required by 10 CFR 50.46 (Ref. 10).

~~LPCI subsystems may be considered OPERABLE during alignment and operation for decay heat removal when below the actual RHR cut in permissive pressure in MODE 3, if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable.~~ 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.

INSERT 1

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, the ADS function is not required when pressure is ≤ 150 psig because the low pressure ECCS subsystems (LPCS and LPCI) are capable of providing flow into the RPV below this pressure. ECCS requirements for MODES 4 and 5 are specified in LCO 3.5.2, "ECCS—Shutdown."

(continued)

INSERT 1

The LCO is modified by a Note that allows a LPCI subsystem to be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut-in permissive pressure. This is necessary since the RHR system is required to operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor, and manual realignment 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. One LPCI subsystem is allowed to be considered inoperable for this temporary period, because in shutdown cooling mode it is fulfilling a decay heat removal capacity function.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1 (continued)

potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

SR 3.5.1.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an initiation signal is allowed to be in a nonaccident position provided the valve will automatically reposition in the proper stroke time. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves potentially capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

This SR is modified by ~~two Notes. Note 1 allows LPCI subsystems to be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the RHR cut in permissive pressure in MODE 3, if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable. This allows operation in the RHR shutdown cooling mode during MODE 3 if necessary.~~ Note ~~2~~ exempts system vent flow paths opened under administrative control. The administrative control should be procedurali[a]zed and include stationing a dedicated individual at the system vent flow path who is in continuous communication with the operators in the control room. This individual will have a method to rapidly close the system vent flow path if directed.

(continued)

that

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

B 3.5.2 ECCS—Shutdown

BASES

BACKGROUND

A description of the High Pressure Core Spray (HPCS) System, Low Pressure Core Spray (LPCS) System, and low pressure coolant injection (LPCI) mode of the Residual Heat Removal (RHR) System is provided in the Bases for LCO 3.5.1, "ECCS—Operating."

APPLICABLE SAFETY ANALYSES

ECCS performance is evaluated for the entire spectrum of break sizes for a postulated loss of coolant accident (LOCA). The long term cooling analysis following a design basis LOCA (Ref. 1) demonstrates that only one ECCS injection/spray subsystem is required, post LOCA, to maintain the peak cladding temperature below the allowable limit. It is reasonable to assume, based on engineering judgement, that while in MODES 4 and 5, one ECCS injection/spray subsystem can maintain adequate reactor vessel water level. To provide redundancy, a minimum of two ECCS subsystems are required to be OPERABLE in MODES 4 and 5.

The ECCS satisfy Criterion 3 of the NRC Policy Statement.

LCO

Two ECCS injection/spray subsystems are required to be OPERABLE. The ECCS injection/spray subsystems are defined as the three LPCI subsystems, the LPCS System, and the HPCS System. The LPCS System and each LPCI subsystem consist of one motor driven pump, piping, and valves to transfer water from the suppression pool to the reactor pressure vessel (RPV). The HPCS System consists of one motor driven pump, piping, and valves to transfer water from the suppression pool or RCIC storage tank to the RPV. Management of gas voids is important to ECCS injection/spray subsystem OPERABILITY.

~~One LPCI subsystem (A or B) may be aligned for decay heat removal in MODE 4 or 5 and considered OPERABLE for the ECCS function, if it can be manually realigned (remote or local) to the LPCI mode and is not otherwise inoperable. Because of low pressure and low temperature conditions in MODES 4~~

(continued)

INSERT 2

INSERT 2

The LCO is modified by a Note that allows a LPCI subsystem to be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut-in permissive pressure. This is necessary since the RHR system is required to operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor, and manual realignment 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. One LPCI subsystem is allowed to be considered inoperable for this temporary period, because in shutdown cooling mode it is fulfilling a decay heat removal capacity function. 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.

BASES

LCO (continued)

~~and 5, sufficient time will be available to manually align and initiate LPCI subsystem operation to provide core cooling prior to postulated fuel uncovery.~~

APPLICABILITY

OPERABILITY of the ECCS injection/spray subsystems is required in MODES 4 and 5 to ensure adequate coolant inventory and sufficient heat removal capability for the irradiated fuel in the core in case of an inadvertent draindown of the vessel. Requirements for ECCS OPERABILITY during MODES 1, 2, and 3 are discussed in the Applicability section of the Bases for LCO 3.5.1. ECCS subsystems are not required to be OPERABLE during MODE 5 with the reactor cavity to steam dryer pool gate removed, and the water level maintained at ≥ 22 ft 8 inches above the RPV flange. This provides sufficient coolant inventory to allow operator action to terminate the inventory loss prior to fuel uncovery in case of an inadvertent draindown.

The Automatic Depressurization System is not required to be OPERABLE during MODES 4 and 5 because the RPV pressure is < 150 psig, and the LPCS, HPCS, and LPCI subsystems can provide core cooling without any depressurization of the primary system.

ACTIONS

A.1 and B.1

If any one required ECCS injection/spray subsystem is inoperable, the required inoperable ECCS injection/spray subsystem must be restored to OPERABLE status within 4 hours. In this Condition, the remaining OPERABLE subsystem can provide sufficient RPV flooding capability to recover from an inadvertent vessel draindown. However, overall system reliability is reduced because a single failure in the remaining OPERABLE subsystem concurrent with a vessel draindown could result in the ECCS not being able to perform its intended function. The 4 hour Completion Time for restoring the required ECCS injection/spray subsystem to OPERABLE status is based on engineering judgment that considered the availability of one subsystem and the low probability of a vessel draindown event.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.2.4 (continued)

in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

In MODES 4 and 5, the RHR System may operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor. Therefore, RHR valves that are required for LPCI subsystem operation may be aligned for decay heat removal. This SR is modified by ~~two Notes~~ Note ~~1 allows one LPCI subsystem of the RHR System to be considered OPERABLE for the ECCS function if all the required valves in the LPCI flow path can be manually realigned (remote or local) to allow injection into the RPV and the system is not otherwise inoperable. This will ensure adequate core cooling if an inadvertent vessel draindown should occur. Note 2~~ exempts system vent flow paths opened under administrative control. The administrative control should be proceduralized and include stationing a dedicated individual at the system vent flow path who is in continuous communication with the operators in the control room. This individual will have a method to rapidly close the system vent flow path if directed.

a

that

REFERENCES

1. USAR, Section 6.3.3.
2. Calculation IP-0-0049.
3. Calculations 01HP09/10/11 and IP-C-0042.
4. Calculations 01LP08/11/14 and IP-C-0043.
5. Calculations 01RH19/20/22/26 and IP-C-0041.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The analysis demonstrates that with containment spray operation the containment pressure remains within design limits.

The RHR Containment Spray System satisfies Criterion 3 of the NRC Policy Statement.

LCO

In the event of a Design Basis Accident (DBA), a minimum of one RHR containment spray subsystem is required to mitigate potential bypass leakage paths and maintain the primary containment peak pressure below design limits. To ensure that these requirements are met, two RHR containment spray subsystems must be OPERABLE. Therefore, in the event of an accident, at least one subsystem is OPERABLE assuming the worst case single active failure. An RHR containment spray subsystem is OPERABLE when the pump, the heat exchanger, and associated piping, valves, instrumentation, and controls are OPERABLE. Management of gas voids is important to RHR Containment Spray System OPERABILITY.

APPLICABILITY

In MODES 1, 2, and 3, a DBA could cause pressurization of primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining RHR containment spray subsystems OPERABLE is not required in MODE 4 or 5.

ACTIONS

A.1

With one RHR containment spray subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE RHR containment spray subsystem is adequate to perform the primary containment cooling function. However, the overall reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced primary containment cooling capability. The 7 day Completion Time was chosen in light of the redundant RHR containment capabilities afforded by the OPERABLE subsystem and the low probability of a DBA occurring during this period.

(continued)

INSERT 3

INSERT 3

The LCO is modified by a Note that allows an RHR containment spray subsystem to be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut-in permissive pressure. This is necessary since the RHR system is required to operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor, and manual realignment from the shutdown cooling mode to the RHR containment spray mode could result in pump cavitation and voiding in the suction piping, resulting in the potential to damage the RHR system, including water hammer. One RHR Containment Spray subsystem is allowed to be considered inoperable for this temporary period, because in shutdown cooling mode it is fulfilling a decay heat removal capacity function. 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.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.6.1.7.1

Verifying the correct alignment for manual, power operated, and automatic valves in the RHR containment spray mode flow path provides assurance that the proper flow paths will exist for system operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these were verified to be in the correct position prior to locking, sealing, or securing. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~Two Notes have been added to this SR. The first Note allows RHR containment spray subsystems to be considered OPERABLE during alignment to and operation in the RHR shutdown cooling mode when below the RHR cut in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable. At these low pressures and decay heat levels (the reactor is shut down in MODE 3), a reduced complement of subsystems should provide the required containment pressure mitigation function thereby allowing operation of an RHR shutdown cooling loop when necessary. The second Note~~ exempts system vent flow paths opened under administrative control. The administrative control should be proceduralized and include stationing a dedicated individual at the system vent flow path who is in continuous communication with the operators in the control room. This individual will have a method to rapidly close the system vent flow path if directed.

This SR is modified by a Note that

SR 3.6.1.7.2

Verifying each RHR pump develops a flow rate ≥ 3800 gpm while operating in the suppression pool cooling mode with flow through the associated heat exchanger ensures that pump performance has not degraded below the required flow rate during the cycle. It is tested in the pool cooling mode to demonstrate pump OPERABILITY without spraying down equipment in primary containment. Although this SR is satisfied by running the pump in the suppression pool cooling mode, the test procedures that satisfy this SR include appropriate acceptance criteria to account for the higher pressure requirements resulting from aligning the RHR System in the containment spray mode. The Frequency of this SR is in accordance with the Inservice Testing Program.

(continued)

B 3.6 CONTAINMENT SYSTEMS

B 3.6.1.9 Feedwater Leakage Control System (FWLCS)

BASES

BACKGROUND

Following a DBA LOCA, the FWLCS supplements the isolation function of primary containment isolation valves (PCIVs) in the feedwater lines which also penetrate the secondary containment. These penetrations are sealed by water form the FWLCS to prevent fission products (post-LOCA containment atmosphere) from leaking past the isolation valves and bypassing the secondary containment after a Design Basis Accident (DBA) loss of coolant accident (LOCA).

The FWLCS consists of two independent, manually initiated subsystems. Each subsystem uses its connected train of the residual heat removal (RHR) system and a header to provide sealing water for pressurizing the feedwater piping either between the inboard and outboard containment isolation check valves or between the outboard containment isolation check valve and the outboard motor-operated gate valve.

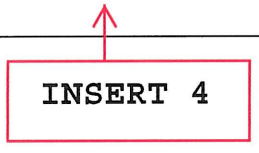
APPLICABLE SAFETY ANALYSES

The analyses described in Reference 1 provide the evaluation of offsite dose consequences during accident conditions. The analyses take credit for manually initiating FWLCS within 20 minutes following the initiation of a DBA LOCA (assuming termination of feedwater flow through the feedwater lines), after which secondary containment bypass leakage through the feedwater lines is assumed to continue until the associated piping is filled, which occurs within one hour after initiation of the accident.

The FWLCS satisfies Criterion 3 of the NRC Policy Statement.

LCO

Two FWLCS subsystems must be OPERABLE so that in the event of an accident, at least one subsystem is OPERABLE assuming a worst-case single active failure. A FWLCS subsystem is OPERABLE when all necessary components are available to pressurize each feedwater piping section with sufficient water pressure to preclude containment atmosphere leakage (following the time period required to fill and pressurize the feedwater piping sections) when the containment atmosphere is at the maximum peak containment pressure, P.



(continued)

INSERT 4

The LCO is modified by a Note that allows one FWLCS subsystem to be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut-in permissive pressure. This is necessary since the RHR system is required to operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor, and manual realignment from the shutdown cooling mode to the FWLCS 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

APPLICABLE SAFETY ANALYSES (continued)

The RHR Suppression Pool Cooling System satisfies Criterion 3 of the NRC Policy Statement.

LCO

During a DBA, a minimum of one RHR suppression pool cooling subsystem is required to maintain the primary containment peak pressure and temperature below the design limits (Ref. 1). To ensure that these requirements are met, two RHR suppression pool cooling subsystems must be OPERABLE. Therefore, in the event of an accident, at least one subsystem is OPERABLE, assuming the worst case single active failure. An RHR suppression pool cooling subsystem is OPERABLE when the pump, heat exchanger, and associated piping, valves, instrumentation, and controls are OPERABLE. Management of gas voids is important to RHR Suppression Pool Cooling System OPERABILITY.

INSERT 5

APPLICABILITY

In MODES 1, 2, and 3, a DBA could cause a release of radioactive material to primary containment and cause a heatup and pressurization of primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations in these MODES. Therefore, the RHR Suppression Pool Cooling System is not required to be OPERABLE in MODE 4 or 5.

ACTIONS

A.1

With one RHR suppression pool cooling subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. In this Condition, the remaining RHR suppression pool cooling subsystem is adequate to perform the primary containment cooling function. However, the overall reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced primary containment cooling capability. The 7 day Completion Time is acceptable in light of the redundant RHR suppression pool cooling capabilities afforded by the OPERABLE subsystem and the low probability of a DBA occurring during this period.

(continued)

INSERT 5

The LCO is modified by a Note that allows one RHR suppression pool cooling subsystem to be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut-in permissive pressure. This is necessary since the RHR system is required to operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor, and manual realignment from the shutdown cooling mode to the RHR suppression pool cooling mode could result in pump cavitation and voiding in the suction piping, resulting in the potential to damage the RHR system, including water hammer. 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 for decay heat removal.

ATTACHMENT 4

Proposed Technical Specifications Changes for Clinton Power Station, Unit 1
Relative to May 1, 2017 License Amendment Request to Implement Technical Specification
Task Force Traveler-542 (ADAMS Accession No. ML17121A517)

Clinton Power Station, Unit 1

Facility Operating License No. NPF-62

AFFECTED TECHNICAL SPECIFICATIONS PAGE

3.5 – 1
3.5 – 6

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), REACTOR PRESSURE VESSEL (RPV) WATER INVENTORY CONTROL, 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 seven safety/relief valves shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3, except ADS valves are not required to be OPERABLE with reactor steam dome pressure ≤ 150 psig.

ACTIONS

----------NOTE----------
LCO 3.0.4.b is not applicable to HPCS.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One low pressure ECCS injection/spray subsystem inoperable.	A.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	7 days
B. High Pressure Core Spray (HPCS) System inoperable.	B.1 Verify by administrative means RCIC System is OPERABLE when RCIC is required to be OPERABLE. AND B.2 Restore HPCS System to OPERABLE status.	1 hour 14 days

(continued)

----------NOTE----------
One low pressure coolant injection (LPCI) subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), REACTOR PRESSURE VESSEL (RPV) WATER INVENTORY CONTROL, AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.2 RPV Water Inventory Control

LCO 3.5.2 DRAIN TIME of RPV water inventory to the top of active fuel (TAF) shall be ≥ 36 hours.

AND

One ECCS injection/spray subsystem shall be OPERABLE.

---NOTE---

~~A Low Pressure Coolant Injection (LPCI) subsystem may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned and not otherwise inoperable.~~

APPLICABILITY: MODES 4 and 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required ECCS injection/spray subsystem inoperable.	A.1 Restore required ECCS injection/spray subsystem to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to establish a method of water injection capable of operating without offsite electrical power.	Immediately

(continued)

One low pressure coolant injection (LPCI) subsystem may be inoperable during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure.