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

January 22, 2018

Mr. Bryan C. Hanson
Senior Vice President
Exelon Generation Company, LLC
President and Chief Nuclear Officer
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: CLINTON POWER STATION, UNIT NO. 1 – ISSUANCE OF AMENDMENT REGARDING RESIDUAL HEAT REMOVAL SUBSYSTEM OPERABILITY REQUIREMENTS DURING DECAY HEAT REMOVAL OPERATIONS (CAC NO. MF9684; EPID L-2017-LLA-0225)

Dear Mr. Hanson:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 215 to Facility Operating License No. NPF-62 for the Clinton Power Station, Unit No. 1. The amendment consists of changes to the technical specifications (TSs) in response to your application dated May 4, 2017.

The amendment deletes a surveillance requirement (SR) Note associated with TS 3.5.1, "Emergency Core Cooling System (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 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 add 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, "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.

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

Sincerely,

Jennivine Rankin, Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-461

Enclosures:
1. Amendment No. 215 to NPF-62
2. Safety Evaluation

cc w/encls: Listserv

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-461

CLINTON POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 215
License No. NPF-62

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

   A. The application for amendment by Exelon Generation Company, LLC (the licensee), dated May 4, 2017, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

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

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

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

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

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-62 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 215, are hereby incorporated into this license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

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

FOR THE NUCLEAR REGULATORY COMMISSION

David J. Wrona, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications and Facility Operating License

Date of Issuance: January 22, 2018

ATTACHMENT TO LICENSE AMENDMENT NO. 215

CLINTON POWER STATION, UNIT NO. 1

FACILITY OPERATING LICENSE NO. NPF-62

DOCKET NO. 50-461

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

Remove	Insert
License NPF-62	License NPF-62
Page 3	Page 3
TSs	TSs
Page 3.5-1	Page 3.5-1
Page 3.5-4	Page 3.5-4
Page 3.5-6	Page 3.5-6
Page 3.5-8	Page 3.5-8
Page 3.6-24	Page 3.6-24
Page 3.6-25	Page 3.6-25
Page 3.6-27a	Page 3.6-27a
Page 3.6-32	Page 3.6-32

(4) Exelon Generation Company, pursuant to the Act and to 10 CFR Parts 30, 40, and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(5) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components;

(6) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility. Mechanical disassembly of the GE14i isotope test assemblies containing Cobalt-60 is not considered separation; and

(7) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30, to intentionally produce, possess, receive, transfer, and use Cobalt-60.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Exelon Generation Company is authorized to operate the facility at reactor core power levels not in excess of 3473 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 215, are hereby incorporated into this license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

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.

---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.

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.	1 hour
	AND		
	B.2	Restore HPCS System to OPERABLE status.	14 days

(continued)

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	----------NOTE---------- 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.

---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.

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.	Immediately
	AND		
	C.2	Restore one ECCS injection/spray subsystem to OPERABLE status.	4 hours

(continued)

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	----------NOTE---------- 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.

---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.

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

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.6.1.7.1	----------NOTE---------- 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.

---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.

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

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.

----------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.

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. AND C.2 Be in MODE 4.	12 hours 36 hours

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 215 TO FACILITY OPERATING LICENSE NO. NPF-62

EXELON GENERATION COMPANY, LLC

CLINTON POWER STATION, UNIT NO. 1

DOCKET NO. 50-461

1.0 INTRODUCTION

By letter dated May 4, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17124A121), Exelon Generation Company, LLC (the licensee), requested changes to the technical specifications (TSs) for Clinton Power Station, Unit 1 (CPS). The proposed amendment would delete a surveillance requirement (SR) Note associated with TS 3.5.1, "ECCS [Emergency Core Cooling System] - 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 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 add 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.

2.0 REGULATORY EVALUATION

The regulatory requirements and guidance documents the U.S. Nuclear Regulatory Commission (NRC or Commission) staff considered in its review of the proposed amendment included the following:

Title 10 of the *Code of Federal Regulations* (10 CFR) 50, Appendix A, General Design Criterion (GDC) 34, "Residual heat removal," requires, "[a] system to remove residual heat shall be provided. The system safety function shall be 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."

Regulation 10 CFR 50, Appendix A, GDC 35, "Emergency core cooling," requires, "[a] system to provide abundant emergency core cooling shall be provided. The system safety function shall be 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."

Regulation 10 CFR 50, Appendix A, GDC 37, "Testing of emergency core cooling system," requires, "[t]he emergency core cooling system shall be designed to permit appropriate periodic pressure and functional testing to assure (1) the structural and leaktight integrity of its components, (2) the operability and performance of the active components of the system, and (3) the operability of the system as a whole and, under conditions as close to design as practical...."

Regulation 10 CFR 50.36, "Technical specifications," details the content and information that must be included in a station's 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.

Regulation 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 loss-of-coolant accident (LOCA).

3.0 TECHNICAL EVALUATION

3.1 System Description

In Attachment 1 of the license amendment request (LAR), the licensee describes the CPS RHR system as follows:

> The CPS RHR system is designed to perform different and independent functions to support plant operations during normal and accident conditions:
>
> - Shutdown cooling (SDC)
> - LPCI [low pressure coolant injection]
> - 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.
>
> 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 [Reactor Pressure Vessel] through the feedwater header.

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 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 CS 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 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.

3.2 Licensee's Proposed Changes

The licensee proposed to delete the following Note 1 from SR 3.5.1.2. The existing Note 2 would remain as the only 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 cut in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable.

The licensee proposed to delete the following Note 1 from SR 3.5.2.4. The existing Note 2 would remain as the only Note.

> 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 licensee proposed to add the following Note to LCO 3.5.1 and 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 licensee proposed to delete the following Note 1 from SR 3.6.1.7.1. The existing Note 2 would be renumbered to a new Note 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.

The licensee proposed to 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 licensee proposed to 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 licensee proposed to 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.

The licensee's application stated that the proposed added Notes are based on a similar footnote that was inadvertently deleted from the original CPS TS during conversion to the improved TSs. The licensee's application further stated that without the proposed changes, plant operation could result in potential damage to the RHR system. Specifically, in the LAR, the licensee described the need for the proposed changes as follows:

> During an NRC CDBI [component design basis inspection] 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 [inspection report dated January 12, 2017 (ADAMS Accession No. ML17013A253)]. 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 [degree Fahrenheit] 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 operations, 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.

In Attachment 1 of the LAR, the licensee provided the following additional information to support the proposed change:

> 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" [(ADAMS Accession No. ML100640465)] and operating experience at Prairie Island (i.e., Licensee Event Report (LER) 1-09-04, [ADAMS Accession No. ML110100248)]. The EGC review of [this information] 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.

3.3 NRC Staff Evaluation

In the LAR, the licensee explains when RHR is aligned to SDC, the potential exists for the water in the RHR pump suction piping 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. To avoid potential damage to the RHR system, the CPS operating procedure directs the operators to declare multiple TS inoperable when operating RHR in SDC with reactor temperatures greater than 150°F. As a result, the licensee proposes to add a Note to TS 3.5.1, TS 3.5.2, 3.6.1.7, 3.6.1.9, and 3.6.2.3, to inform operators that one LPCI subsystem (for LCOs 3.5.1 and 3.5.2), one RHR containment spray subsystem (for LCO 3.6.1.7), one FWLCS subsystem (for LCO 3.6.1.9), and one RHR suppression pool cooling subsystem (for LCO 3.6.2.3) 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. This provides consistency between the TS and the CPS operating procedures. As a result of the new Note and consistent with the CPS operating procedures, during alignment and operation of one subsystem for decay heat removal

with reactor steam dome pressure less than the RHR cut in permissive pressure, the operators will declare the appropriate subsystem inoperable and perform the required actions under the respective TS LCOs.

Based on the above, the NRC staff finds that the current note in SR 3.5.1.2, SR 3.5.2.4, and SR 3.6.1.7.1 could potentially allow operating conditions to exist that could adversely impact the function of the RHR system because 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. This threat is greatest during the early stages of Mode 3 operation when the SDC water temperature is highest. As such, the NRC staff finds that removal of the note is acceptable. In addition, based on the above justification, the staff finds it acceptable to add a Note in the LCO 3.5.1, LCO 3.5.2, LCO 3.6.1.7, LCO 3.6.1.9, and LCO 3.6.2.3 to clarify that one of the required subsystems in each of the affected TS sections listed above should be considered inoperable during alignment and operation of the RHR system for SDC (i.e., decay heat removal) with the reactor steam dome pressure less than the RHR cut in permissive value. For this reason, the NRC staff also finds that the new Note added to the LCOs continue to meet the requirements in 10 CFR 50.36(c)(2). In addition, the NRC staff notes the changes do not involve any physical changes to the structures, systems, or components at CPS. The change reflects the current plant configuration of the RHR system design and as such, continues to meet the applicable regulations described in Section 2.0 of this safety evaluation.

The licensee's application dated May 4, 2017, provided revised TS Bases pages to be implemented with the associated TS changes. These pages were provided for information only. Changes to the TS Bases would be made in accordance with the TS Bases Control Program in TS 5.5.11.

In addition, Attachment 2 of the LAR dated May 4, 2017, contains marked up TS pages which show the proposed change. The NRC staff notes the frequency of SR 3.5.1.4 and SR 3.6.1.7.2 within Attachment 2 have since been updated. By letter dated May 26, 2017 (ADAMS Accession No. ML17073A067), the NRC issued Amendment No. 212 which changed the frequency of SR 3.5.1.4 and SR 3.6.1.7.2 from "In accordance with the Inservice Testing Program" to "In accordance with the INSERVICE TESTING PROGRAM."

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois State official was notified of the proposed issuance of the amendment on November 9, 2017. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (82 FR 31095, dated July 5, 2017). Accordingly, the amendment meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no

environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: M. Razzaque, NRR

Date of issuance: January 22, 2018

SUBJECT: CLINTON POWER STATION, UNIT NO. 1 – ISSUANCE OF AMENDMENT REGARDING RESIDUAL HEAT REMOVAL SUBSYSTEM OPERABILITY REQUIREMENTS DURING DECAY HEAT REMOVAL OPERATIONS (CAC NO. MF9684; EPID L-2017-LLA-0225) DATED JANUARY 22, 2018

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ADAMS Accession No. ML17324A354 ***via memo** ****via email**

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