

RS-15-260

10 CFR 50.90

September 30, 2015

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:** Response to Request for Additional Information Regarding License Amendment Request for a One-Time Extension of the Shutdown Service Water Division 2 Subsystem Completion Time

- References:**
- (1) Letter from Patrick R. Simpson (Exelon Generation Company, LLC) to U.S. NRC, "Exigent License Amendment Request for a One-Time Extension of the Shutdown Service Water Division 2 Subsystem Completion Time," dated September 10, 2015
  - (2) Letter from Eva Brown (U.S. NRC) to Bryan C. Hanson (Exelon Generation Company, LLC), "Clinton Power Station, Unit No. 1 – Request for Additional Information Related to One-Time Extension of Completion Time for Shutdown Service Water (TAC No. MF6705) (RS-15-264)," dated September 25, 2015

In Reference 1, Exelon Generation Company, LLC, (EGC) requested, in accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," NRC approval of a proposed one-time extension of the Completion Time (CT) to restore the Division 2 Shutdown Service Water (SX) subsystem to Operable status associated with Technical Specifications (TS) Limiting Condition for Operation (LCO) 3.7.1, "Division 1 and 2 Shutdown Service Water (SX) Subsystems and Ultimate Heat Sink (UHS)," from 72 hours to 7 days.

In Reference 2, the NRC requested that EGC provide additional information to support their review of the subject amendment request (i.e., Reference 1). The requested information is provided in Attachment 1 to this letter.

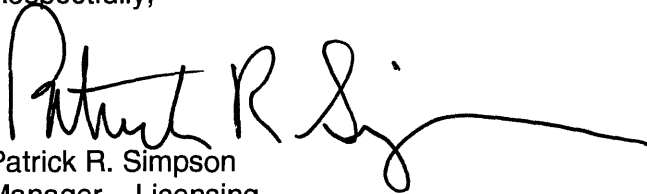
Attachment 2 includes revised marked-up TS pages with the proposed changes indicated based on the additional information requested. Attachment 3 includes revised marked-up TS Bases pages with the proposed changes indicated based on the additional information provided in Attachment 1. The TS Bases pages are provided for information only and do not require NRC approval. A summary of the regulatory commitments associated with this letter and RS-15-246 (Reference 1) are documented in Attachment 4.

Subsequent to issuance of Reference 2, a follow-up question was provided in a call between Eva Brown (U. S. NRC) and Timothy Byam (Exelon Generation Company, LLC). This question concerned conflicting statements in Attachment 5 to Reference 1. On page 4-5 of Attachment 5 it states that the CPS PRA model for internal events received a peer review against Addendum A of the ASME/ANS PRA Standard. However, on page 4-6 of Attachment 5 it states the formal peer review was performed against Addendum B of the ASME/ANS PRA Standard. It has been determined that the statement on page 4-6 contains an editorial error and should have referred to Addendum A of the ASME/ANS PRA Standard. It has been confirmed that the formal industry peer review in October 2009 was performed against Addendum A of the ASME/ANS PRA Standard.

If you should have any questions concerning this letter, please contact Mr. Timothy A. Byam at (630) 657-2818.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 30th day of September 2015.

Respectfully,



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

Attachments:

1. Response to Request for Additional Information
2. Proposed Technical Specification Pages for Clinton Power Station
3. Proposed Technical Specification Bases Pages for Clinton Power Station (For Information Only)
4. Summary of Regulatory Commitments

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

## ATTACHMENT 1

### Response to Request for Additional Information

In a letter from Eva Brown (U.S. NRC) to Bryan Hanson (Exelon Generation Company, LLC), "Clinton Power Station, Unit No. 1 – Request for Additional Information Related to One-Time Extension of Completion Time for Shutdown Service Water (TAC No. MF6705) (RS-15-264)," dated September 25, 2015, the following request for additional information was provided.

#### **NRC RAI 1**

*The proposed change uses text that does not list an explicit expiration date for the proposed one-time condition. The term "outage window" does not appear to provide the necessary clarity for when entry into the condition would be allowed. The proposed construction of the Technical Specification (TS) does not provide clarity on whether or not repeated entry and exit of the condition is allowed and whether or not a cumulative limit is placed on time in the condition. Address the explicit expiration date for the proposed one-time condition as well as a discussion of whether or not repeated condition entry would be possible and if a cumulative limit for time in the condition is not required.*

#### **EGC Response**

Exelon Generation Company, LLC (EGC) plans to replace the Clinton Power Station (CPS) Division 2 Shutdown Service Water (SX) System pump during a CPS planned Division 2 SX System outage window scheduled for the week of October 26, 2015. The work is currently scheduled to begin October 26, 2015. Should weather prevent beginning the outage on October 26, the outage window will begin as soon as weather permits. As noted in Attachment 1 to the license amendment request (Reference 1), the scheduled pump replacement is anticipated to take approximately 137 hours with an additional 24 hours contingency to account for potential weather delays. Once the pump replacement begins, the entire evolution is scheduled to be completed within 7 days. To account for potential weather delays the expected expiration date for the proposed one-time CT extension is defined as November 8, 2015. Therefore, the duration of the proposed TS change is defined as October 26 – November 8, 2015. EGC has revised the proposed changes shown on the mark-up of the CPS Technical Specifications (TS) to reflect when the proposed extension would expire. The new proposed TS mark-ups and associated Bases mark-ups are provided in Attachments 2 and 3.

Because the proposed CT extension is a one-time change, there will not be repeated entry into the Required Action associated with the proposed CT extension. When the Division 2 SX subsystem is declared to be inoperable in support of the pump replacement it will remain inoperable until the pump is replaced, tested and declared operable again. Once the Division 2 SX pump is replaced, the proposed new Condition C will no longer be applicable and Condition B will be the condition entered whenever Division 1 or 2 SX subsystem is inoperable.

#### **NRC RAI 2**

*The license amendment request was submitted on a risk informed basis using the guidance of RG 1.177. Sections 3.0 and 4.0 of Attachment 1 to the submittal discussed some measures related to the defense-in-depth attributes in RG 1.177 arising from general work control processes and identification of risk-significant configurations from the risk analysis. However, the NRC staff found the following two defense-in-depth attributes from RG 1.177 were not adequately addressed:*

- *System redundancy, independence, and diversity are preserved commensurate with the*

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### Response to Request for Additional Information

*expected frequency, consequences of challenges to the system, and uncertainties (e.g., no risk outliers).*

- *Defense against potential common cause failures is preserved, and the potential for the introduction of new common cause failure mechanisms is assessed.*

*Specifically, the NRC staff did not find a discussion regarding the effects of the pump replacement activities on the risk of common cause failures beyond the commitment to protect SX Divisions 1 and 3. The pump replacement activity likely involves movements of heavy loads in and around the intake structure. Describe how risks from this activity were assessed and would be controlled. Specifically, the licensee is requested to provide a description of any protections against direct impact on protected SX division components, protection against hazards such as internal flooding that could result from a load drop on piping within the intake structure, and protection against initiating events, such as loss of plant service water or internal power distribution, that could require actuation of the SX system.*

#### **EGC Response**

The system description provided in Section 3.0 of Attachment 1 to the license amendment request (Reference 1) states that Division 1 and 2 of the SX system are cross-tied with double isolation valves to provide added flexibility to the system. The Tier 2 discussion provided in Attachment 1 to Reference 1, states that "although not credited in the PRA evaluation supporting the proposed CT extension, there is a cross-tie between the Divisions 1 and 2 SX subsystems which will be available for use if conditions warrant it." There is procedural guidance provided in CPS Procedure No. 3211.01, "Shutdown Service Water," (Reference 2) for the operators to utilize this cross-tie in the event that it is needed and available.

The SX System does not operate during normal station operation and shutdown. During normal station operation and shutdown, the Plant Service Water (WS) System supplies water to safety-related equipment through SX System piping. The SX System pumps automatically start upon receiving a signal indicating either a loss-of-coolant accident (LOCA), or a low pressure signal from the SX System header which indicates a loss-of-offsite power (LOOP). The SX System pump start then causes the isolation valves between the SX System and WS System to close.

CPS Updated Safety Analysis Report (USAR) Section 9.2.1.2.3 states that the SX System provides a reliable source of cooling water for station auxiliaries which are essential to safe shutdown of the station following a design-basis loss-of-coolant accident. The SX System consists of three divisions which correspond to the three electrical safety divisions. Any two of these divisions operating together are adequate to assure safe shutdown of the station. The three SX System divisions are separated and protected to ensure that in any of the following events sufficient equipment remains operational to safely shut down the station.

1. safe shutdown earthquake,
2. design-basis flood,
3. tornado,
4. flooding or steam release from equipment failure such as pipe or tank rupture,
5. pipe whip and jet forces resulting from pipe rupture,

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### Response to Request for Additional Information

6. missiles resulting from equipment failure,
7. fire,
8. LOCA, and
9. LOOP

The system is also designed so that no single-failure of a component will compromise the ability of the system to safely shut down the unit. The SX System pump cubicles and all system piping are protected from tornado generated missiles and floods. Watertight doors designed to withstand the hydrostatic head of the maximum flood level are provided for all doorways located on both the entrance walls and the internal walls of the SX System pump rooms which are below the maximum flood level.

Portions of the SX System are located in the circulating water screen house, the auxiliary building, the fuel building, the diesel generator building, the control building, and the containment. Except for the circulating water screen house, all of these buildings are Seismic Category I structures. The cubicles for the SX System pumps in the screen house are Seismic Category I. The SX System piping is routed from the pump cubicles underground beneath the floor of the screen house to the wall of the screen house. The portion of the screen house below the floor through which the SX System piping is routed is also Seismic Category I. Therefore, all the areas through which the SX System is routed are Seismic Category I.

The shutdown service water system equipment is the only equipment in the screen house that is required to safely shut down the reactor or to maintain it in a safe shutdown condition. The three shutdown service water pumps and strainers are in their own missile-protected cubicles. Each cubicle has its own cooling unit which is electrically segregated from the others. Each cubicle is flood protected by bulkhead doors. No single failure of the equipment associated with one cubicle will have a detrimental effect on the rest of the system.

Replacement of the Division 2 SX pump will require the use of a crane to lift the pump assembly from the screen house. Measures will be in place to ensure that the required heavy load lift does not present the potential for damaging the protected Division 1 and 3 systems. These compensatory measures include:

1. Protected systems will be posted in accordance with EGC procedure OP-AA-108-117, "Protected Equipment Program," (Reference 3). This procedure provides guidance for protecting equipment in order to minimize plant risk.
2. Access to the Division 2 SX subsystem pump room will be directly into the room and Security will ensure individuals entering room have required security access requirements. Access into the Division 2 SX subsystem pump room will not be allowed from the Division 1 or Division 3 SX subsystem pump rooms (i.e., the flood protection doors between the divisional pump rooms will remain closed to preclude potential internal flood propagation between SX divisions given a postulated load drop).
3. Rigging of the screen house roof plugs, Division 2 SX pump motor, and the Division 2 SX pump will all be controlled to stay within the Division 2 foot print in the screen house. EGC will setup a pathway that lays out the Division 2 area and will utilize spotters for

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### Response to Request for Additional Information

controls. The designated load path will ensure protection against a potential for a load drop on piping within the intake structure and protection against initiating events that could require actuation of the SX system.

The movement of Division 2 SX pump, pump motor, and screen house roof plugs has been planned to ensure that the loads will not travel over the WS System or the Circulating Water System pumps. In addition, there are no Division 1 or Division 3 SX System piping or electrical components in the planned load path for removal of the Division 2 SX System pump.

In summary, based on the approved safe load path and the above compensatory measures, EGC has taken appropriate actions to ensure protections against direct impact on protected SX division components, protection against hazards such as internal flooding that could result from a load drop on piping within the intake structure, and protection against initiating events, such as loss of plant service water or internal power distribution, that could require actuation of the SX system. The compensatory measures listed above are identified as commitments in Attachment 4.

#### **References**

1. Letter from Patrick R. Simpson (Exelon Generation Company, LLC) to U.S. NRC, "Exigent License Amendment Request for a One-Time Extension of the Shutdown Service Water Division 2 Subsystem Completion Time," dated September 10, 2015
2. CPS Procedure No. 3211.01, "Shutdown Service Water," Revision 31d
3. Exelon Generation Company Procedure OP-AA-108-117, Protected Equipment Program," Revision 4

**ATTACHMENT 2**

**Proposed Technical Specification Pages for Clinton Power Station**

3.7 PLANT SYSTEMS

3.7.1 Division 1 and 2 Shutdown Service Water (SX) Subsystems and Ultimate Heat Sink (UHS)

LCO 3.7.1 Division 1 and 2 SX subsystems and the UHS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. UHS water volume not within limit	A.1 Restore UHS water volume to within limit.	90 days
<p>-----NOTE-----                      Not applicable during replacement of Division 2 SX pump during the Division 2 SX system outage window from October 26 through November 8, 2015.                      -----</p>	<p>-----NOTES-----                      1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources—Operating," for diesel generator made inoperable by SX.                      2. Enter applicable Conditions and Required Actions of LCO 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System—Hot Shutdown," for RHR shutdown cooling subsystem made inoperable by SX.                      -----</p>	
B. Division 1 or 2 SX subsystem inoperable.	B.1 Restore SX subsystem to OPERABLE status.	72 hours

(continued)



Actions (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>-----NOTE----- Only applicable during replacement of Division 2 SX pump during the Division 2 SX system outage window from October 26 through November 8, 2015. ----- C. Division 2 SX subsystem inoperable.</p>	<p>-----NOTES----- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources—Operating," for diesel generator made inoperable by SX.  2. Enter applicable Conditions and Required Actions of LCO 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System—Hot Shutdown," for RHR shutdown cooling subsystem made inoperable by SX. ----- C.1 Restore Division 2 SX subsystem to OPERABLE status.</p>	<p>7 Days</p>
<p>ⒸD. Required Action and associated Completion Time of Condition B or C not met.</p>	<p>-----NOTE----- LCO 3.0.4.a is not applicable when entering MODE 3. ----- ⒸD.1 Be in MODE 3.</p>	<p>12 hours</p>
<p>ⒹE. Required Action and associated Completion Time of Condition A not met.  <u>OR</u>  Division 1 and 2 SX subsystems inoperable.</p>	<p>ⒹE.1 Be in MODE 3. <u>AND</u> ⒹE.2 Be in MODE 4.</p>	<p>12 hours  36 hours</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.1.1     Verify UHS water volume is $\geq$ 593 acre-ft.	In accordance with UHS Erosion, Sediment Monitoring, and Dredging Program
SR 3.7.1.2     Verify each required SX subsystem manual, power operated, and automatic valve in the flow path servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.1.3     Verify each SX subsystem actuates on an actual or simulated initiation signal.	In accordance with the Surveillance Frequency Control Program

**ATTACHMENT 3**

**Proposed Technical Specification Bases Pages for Clinton Power Station  
(For Information Only)**

BASES (continued)

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ACTIONS

A.1

If the UHS is inoperable (i.e., the UHS water volume is not within the limit), action must be taken to restore the inoperable UHS to OPERABLE status within 90 days. The 90 day Completion Time is reasonable considering the time required to restore the required UHS volume, the margin contained in the available heat removal capacity, and the low probability of a DBA occurring during this period.

B.1

If the Division 1 or 2 SX subsystem is inoperable, it must be restored to OPERABLE status within 72 hours. With the unit in this condition, the remaining OPERABLE Division 1 or 2 SX subsystem is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE Division 1 or 2 SX subsystem could result in loss of the SX function. The 72 hour Completion Time was developed taking into account the redundant capabilities afforded by the OPERABLE subsystem and the low probability of a DBA occurring during this period.

Condition B is modified by a Note. The Note indicates that this Condition is not applicable during replacement of the Division 2 SX pump during the Division 2 SX system outage window from October 26 through November 8, 2015.

The Required Action is modified by two Notes indicating that the applicable Conditions of LCO 3.8.1, "AC Sources—Operating," and LCO 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System—Hot Shutdown," be entered and the Required Actions taken if the inoperable SX subsystem results in an inoperable DG or RHR shutdown cooling subsystem, respectively. This is in accordance with LCO 3.0.6 and ensures the proper actions are taken for these components.

C.1

During replacement of the Division 2 SX pump in the Division 2 SX system outage window from October 26 through November 8, 2015, the Division 2 SX subsystem is inoperable, and it must be restored to OPERABLE status within 7 days. This Completion Time is based upon a risk-informed assessment that concluded that the associated risk with the system in the specified configuration is acceptable.

Condition C is modified by a Note. The Note indicates that this Condition is only applicable during replacement of the Division 2 SX pump during the Division 2 system outage

(continued)

BASES

ACTIONS

C.1 (continued)

window from October 26 through November 8, 2015.

Required Action C.1 is modified by two Notes as described in Action B.1 above.

ED.1 (continued)

If the Required Action and associated Completion Time of Condition B or C is not met, the plant must be brought to a condition in which the overall plant risk is minimized. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours. Remaining in the Applicability of the LCO is acceptable because the plant risk in MODE 3 is similar to or lower than the risk in MODE 4 (Ref. 8) and because the time spent in MODE 3 to perform the necessary repairs to restore the system to OPERABLE status will be short. However, voluntary entry into MODE 4 may be made as it is also an acceptable low-risk state. The allowed Completion Time is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Required Action ED.1 is modified by a Note that prohibits the application of LCO 3.0.4.a. This Note clarifies the intent of the Required Action by indicating that it is not permissible under LCO 3.0.4.a to enter MODE 3 from MODE 4 with the LCO not met. While remaining in MODE 3 presents an acceptable level of risk, it is not the intent of the Required Action to allow entry into, and continue operation in, MODE 3 from MODE 4 in accordance with LCO 3.0.4.a. However, where allowed, a risk assessment may be performed in accordance with LCO 3.0.4.b. Consideration of the results of this risk assessment is required to determine the acceptability of entering MODE 3 from MODE 4 when this LCO is not met.

DE.1 and DE.2

If the Required Action and associated Completion Time of Condition A or B are not met, or both Division 1 and 2 SX subsystems are inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the

(continued)

BASES (continued)

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ACTIONS

E.1 and E.2 (continued)

required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.7.1.1

This SR verifies UHS water volume is  $\geq 593$  acre-feet (excluding sediment). The Surveillance Frequency is in accordance with UHS Erosion, Sediment Monitoring and Dredging Program.

With regard to UHS water volume values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 9).

SR 3.7.1.2

Verifying the correct alignment for each manual, power operated, and automatic valve in each Division 1 and 2 SX subsystem flow path provides assurance that the proper flow paths will exist for Division 1 and 2 SX subsystem 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 is also allowed to be in the nonaccident position and yet considered in the correct position, provided it can be automatically realigned to its accident position within the required time. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

Isolation of the SX subsystem to components or systems does not necessarily affect the OPERABILITY of the associated SX subsystem. As such, when all SX pumps, valves, and piping are OPERABLE, but a branch connection off the main header is isolated, the associated SX subsystem needs to be evaluated to determine if it is still OPERABLE. Alternatively, it is acceptable and conservative to declare an SX subsystem inoperable when a branch connection is isolated.

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

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(continued)

**ATTACHMENT 4**

**Summary of Regulatory Commitments**

### Summary of Regulatory Commitments

The following table identifies commitments made in this document and RS-15-246. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITTED DATE OR "OUTAGE"	COMMITMENT TYPE	
		ONE-TIME ACTION (YES/NO)	PROGRAM-MATIC (YES/NO)
Implement the compensatory measures (items 1 through 5) listed in Attachment 1 of RS-15-246, Section 3.0, Tier 2 Discussion	Upon implementation of the one-time extension of the SX train Completion Time.	Yes	No
Implement Compensatory measures (items 1 through 3) listed in Attachment 1 of RS-15-260, Response to RAI 2	Upon implementation of the one-time extension of the SX train Completion Time	Yes	No