

RS-17-076

10 CFR 50.90

July 18, 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 Revise Spent Fuel Pool Level

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 revises the design value for the spent fuel storage pool in TS 4.3.2, "Drainage," to the appropriate value.

The current value in TS 4.3.2 was included in the original CPS TS. However, an inconsistency with the TS value, relative to the original design basis was identified during a U.S. Nuclear Regulatory Commission (NRC) Component Design Basis Inspection (CDBI) at CPS in 2016. When this discrepancy was identified during the CDBI, EGC entered the issue into the EGC Corrective Action Program (CAP).

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 page with the proposed change indicated.

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 July 18, 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. Ken Nicely at (630) 657-2803.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 18th day of July 2017.

Respectfully,


Patrick R. Simpson
Manager – Licensing

Attachments:

1. Evaluation of Proposed Change
2. Proposed Technical Specifications Changes for Clinton Power Station, Unit 1

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

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Evaluation of Proposed Change

1.0 SUMMARY DESCRIPTION

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (EGC) requests an amendment to Appendix A, Technical Specifications (TS) of Facility Operating License (FOL) No. NPF-62 for Clinton Power Station (CPS), Unit 1. The proposed amendment revises the design value for the spent fuel storage pool in TS 4.3.2, "Drainage," to the appropriate value.

The current value in TS 4.3.2 was included in the original CPS TS. However, a discrepancy between the TS value and the original design basis was identified during a U.S. Nuclear Regulatory Commission (NRC) Component Design Basis Inspection (CDBI) at CPS in 2016. When this was identified during the CDBI, EGC entered the issue into the EGC Corrective Action Program (CAP).

2.0 DETAILED DESCRIPTION

The proposed change revises the design value for the spent fuel storage pool level in TS 4.3.2 from the current value of 754 feet, 0 inches to 741 feet, 0 inches. The proposed TS states:

TS 4.3.2 Drainage

The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 741 feet, 0 inches.

Attachment 2 provides the marked-up TS page with the proposed change indicated.

During an NRC CDBI at CPS in 2016, NRC inspectors identified an inconsistency between the site specific value in CPS TS 4.3.2 and the original design basis for the spent fuel storage pool, relative to the basis for the Design Features section of TS (i.e., as described in 10 CFR 50.36(c)(4)). Specifically, 10 CFR 50.36(c)(4) states:

"Design features to be included are those features of the facility such as materials of construction and geometric arrangements, which, if altered or modified, would have a significant effect on safety and are not covered in categories described in paragraphs (c) (1), (2), and (3) of this section."

The current TS 4.3.2 value of 754 feet, 0 inches for the SFP level is not consistent with the regulatory basis for a "Design Feature." EGC has determined that the correct value for TS 4.3.2 is 741 feet, 0 inches. The basis and justification for this revised SFP level is described in Section 3.0, "Technical Evaluation."

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3.0 TECHNICAL EVALUATION

Spent Fuel Storage Pool Design Basis

The CPS spent fuel storage facility consists of a spent fuel pool (SFP), a fuel transfer pool (FTP), a fuel cask storage pool (FCSP), a fuel cask washdown area (FCWA), and an upper containment fuel pool (UCFP). The SFP, FTP, FCSP, and FCWA are adjacent to each other in the fuel building (FB) and are physically separated from each other by removable gates.

The structures housing the CPS spent fuel storage facility (i.e., the FB and containment) are designed to seismic Category I criteria, as are the fuel storage racks, pool liners, gates, and storage pools. These buildings are also designed against flooding and tornado missiles. Thus, the CPS spent fuel storage facility complies with the requirements of 10 CFR Part 50, Appendix B, "General Design Criteria" (GDC) 2 and the guidelines of Regulatory Guide (RG) 1.29, "Seismic Design Classification," and, RG 1.117, "Tornado Design Classification."

The CPS spent fuel storage facility complies with GDC 61, "Fuel storage and handling and radioactivity control" and RG 1.13, "Spent Fuel Storage Facility Design Basis," Revision 1. Regulatory Position C.6 of RG 1.13 establishes the design criteria for TS 4.3.2:

"Drains, permanently connected mechanical or hydraulic systems, and other features that by maloperation or failure could cause loss of coolant that would uncover fuel should not be installed or included in the design. Systems for maintaining water quality and quantity should be designed so that any maloperation or failure of such systems (including failures resulting from the Safe Shutdown Earthquake) will not cause fuel to be uncovered."

The original design criteria for the SFP, FTP and FCSP (i.e., the FB spent fuel storage pools) established a level of SFP inventory that provides a safe shielding level:

"The level in the fuel storage pools will be maintained at a minimum of eight feet above the top of the fuel during normal station operation. These levels of water provide adequate shielding for personnel protection."

The CPS SFP safe shielding level design criteria is consistent with the requirements of NUREG-0800, U.S. Nuclear Regulatory Commission Standard Review Plan, "Chapter 9.1.3, "Spent Fuel Pool Cooling and Cleanup System," Revision 4:

"The spent fuel pool and cooling systems have been designed so that in the event of failure of inlets, outlets, piping, or drains, the pool level will not be inadvertently drained below a point approximately 3 meters (10 feet) above the top of the active fuel."

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The CPS SFP design, including the safe shielding level, was approved by the NRC in NUREG-0853, "Safety Evaluation Report related to the operation of Clinton Power Station Unit 1:"

"No connections are provided to the spent fuel pool that may cause the pool water to be drained below a safe shielding level. All lines that connect to the pool and extend below the safe level of the pool water are equipped with syphon breakers, check valves, or other means to prevent inadvertent pool drainage."

Spent Fuel Storage Pool Operation

The water level in the FB spent fuel storage pools is normally maintained at an elevation of 754 feet, 0 inches. This level is approximately 27 feet above the top of irradiated fuel assemblies (i.e., elevation 726 feet, 7¾ inches) and approximately 19 feet above the safe shielding level.

The water level in the FB spent fuel storage pools is procedurally controlled by Operational Requirements Manual (ORM) 2.4.8, "Spent Fuel Storage, Cask Storage and Upper Containment Pools." Specifically, ORM 2.4.8 requires maintaining at least 23 feet of water above the top of irradiated fuel assemblies (i.e., elevation of 749 feet, 7¾ inches for the SFP and FCSP). The FCWA is normally empty (i.e., not filled with water).

Several fuel pool cooling system (FC) lines which are not equipped with check valves, discharge into the FB spent fuel storage pools below 754 feet, 0 inches. These FC lines, and the associated discharge elevations are described in Table 1 below. Since these FC discharge lines are not equipped with a check valve (i.e., to prevent inadvertent drainage), failure of any of one of these lines, external to the FB spent fuel storage pools, would result in a siphon effect, which in turn, would drain the spent fuel storage pools to the discharge elevation of the failed FC line. As depicted in Table 1, the lowest discharge point in the SFP is a 14-inch line at an elevation of 741 feet, 0 inches.

Alternatively, if there is no water in the FTP, FCSP, or FCWA, the potential failure of the gates separating these pools from the SFP would lower SFP level to 740 feet, 6 inches. The SFP gates are non-safety related but seismically supported. The SFP gates were analyzed for seismic SSE and thermodynamic (i.e., sloshing) loads with water on only one side of the gate, which is the bounding condition for largest loads on the gates. The gates are held in place in the FB (i.e., a seismic Category 1 structure) by support brackets. Therefore, the gates will not fail during a seismic event. However, the pneumatic gate seals are non-safety, non-seismic and supplied by the instrument air (IA) system. Each gate has two redundant seals, one on either side of the gate. The IA supply to each seal has a check valve to prevent loss of pressure to the seal on loss of IA. In addition, CPS maintains backup air bottles that are permanently connected to the IA system.

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| Table 1 | | | |
|---|---------------------|---|-----------------------------------|
| FC Pipe Discharge Lines not Equipped with Check Valves ⁽¹⁾ | | | |
| Location | Equipment ID Number | Equipment Type | Elevation |
| Spent Fuel Pool | 1FC104A- ½" | ½ inch Siphon Breaker | 749 feet, 0 inches |
| | 1FC01FB-6" | 6-inch Pipe Discharge | 742 feet, 0 inches ⁽²⁾ |
| | 1FC107AA- ½" | ½ inch Siphon Breaker | 749 feet, 6 inches |
| | 1FC14CA-14" | 14-inch Pipe Discharge | 741 feet, 0 inches |
| | 1FC107AB- ½" | ½ inch Siphon Breaker | 749 feet, 6 inches |
| | 1FC14CD-14" | 14-inch Pipe Discharge | 741 feet, 0 inches |
| Fuel Transfer Pool ⁽¹⁾ | 1FC105A- ½" | ½ inch Siphon Breaker | 751 feet, 0 inches |
| Fuel Cask Storage Pool ⁽¹⁾ | 1FC106A- ½" | ½ inch Siphon Breaker | 750 feet, 0 inches |
| | 1FCH4A-4" | 4 inch Drain Pipe (with a locked close valve) | 742 feet, 6 inches |

- (1) There is an additional 4-inch FC line in both the FTP and the FCSP that discharge to diffusers at an elevation of approximately 712 feet. Both of these lines are equipped with check valves to prevent inadvertent draining.
- (2) The 6-inch FC pipe in the SFP discharges at an elevation of 736 feet, 6 inches. However, the lowest elevation of the line outside of the SFP is 742 feet with a check valve. In the event of a failure of this line, the siphon effect would be limited to an elevation of 742 feet.

Spent Fuel Storage TS Requirement

CPS TS 4.3.2, "Drainage," as part of TS Section 4.0, "Design Features," states that the spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 754 feet. The NRC approved the spent fuel storage pool design, as well as TS Section 5.0, "Design Features," TS 5.6.2, "Drainage," in NUREG-0853.

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 "Drainage" Design Feature in the original CPS TS (i.e., TS 5.6.2) was consistent with the same note in NUREG-0123, "Standard Technical Specifications, General Electric BWR/5 Plants," Draft Revision 4.

This TS was retained and renumbered to TS 4.3.2 as an administrative change during conversion of the CPS TS to the Improved Technical Specifications (ITS) (i.e., NUREG-1434, Standard Technical Specifications, General Electric BWR/6 Plants). This conversion was approved by the NRC on December 2, 1994 as part of Amendment 95 to CPS FOL 62, (ADAMS Accession No. ML021000089). In both NUREG-0123 and NUREG-1434, the value specified in the "Drainage" TS is bracketed, and therefore requires a site-specific value.

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Justification for Proposed Change

The proposed value for the SFP level in TS 4.3.2 (i.e., 741 feet, 0 inches) is consistent with both GDC-61 and Regulatory Position C.6 of RG 1.13, Revision 1. Specifically, the failure of any FC discharge lines at or above this value would not cause the fuel to be uncovered.

In addition, the proposed value, which is approximately 13 feet above the top of irradiated fuel assemblies, is consistent with NUREG-0800, Chapter 9.1.3, "Spent Fuel Pool Cooling and Cleanup System," Revision 4:

"The spent fuel pool and cooling systems have been designed so that in the event of failure of inlets, outlets, piping, or drains, the pool level will not be inadvertently drained below a point approximately 3 meters (10 feet) above the top of the active fuel."

Finally, the proposed value is consistent with the original CPS design basis, as approved by the NRC in NUREG-0853:

"The level in the fuel storage pools will be maintained at a minimum of eight feet above the top of the fuel during normal station operation. These levels of water provide adequate shielding for personnel protection."

"No connections are provided to the spent fuel pool that may cause the pool water to be drained below a safe shielding level. All lines that connect to the pool and extend below the safe level of the pool water are equipped with syphon breakers, check valves, or other means to prevent inadvertent pool drainage."

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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, GDC 61, "Fuel storage and handling and radioactivity control," requires that the fuel storage and handling, radioactive waste, and other systems which may contain radioactivity shall be designed to assure adequate safety under normal and postulated accident conditions. These systems shall be designed (1) with a capability to permit appropriate periodic inspection and testing of components important to safety, (2) with suitable shielding for radiation protection, (3) with appropriate containment, confinement, and filtering systems, (4) with a residual heat removal capability having reliability and testability that reflects the importance to safety of decay heat and other residual heat removal, and (5) to prevent significant reduction in fuel storage coolant inventory under accident conditions.

10 CFR 50.36, "Technical specifications," details the content and information that must be included in a station's Technical Specifications (TS). As described in 10 CFR 50.36(c)(4), "Design Features," are the lowest functional capability or performance levels of equipment required for safe operation of the facility.

RG 1.13, "Spent Fuel Storage Facility Design Basis," Regulatory Position C.6 establishes the design criteria for drains, permanently connected mechanical or hydraulic systems, and other features that by maloperation or failure could cause loss of coolant that would uncover fuel should not be installed or included in the design.

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

4.2 No Significant Hazards Consideration

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (EGC) requests an amendment to Facility Operating License No. NPF-62 for Clinton Power Station (CPS), Unit 1. The proposed amendment revises the design value for the spent fuel storage pool (SFP) in Technical Specifications (TS) 4.3.2, "Drainage," to the appropriate value.

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

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

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

1. Does the proposed 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 proposed change will revise the current TS 4.3.2 value for the SFP level design to be consistent with the original design basis value and the applicable regulatory requirements. The proposed value will continue to ensure that inadvertent draining of the SFP will not result in the uncovering of spent fuel, as well as provide adequate shielding for personnel protection.

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. The proposed change will revise the current TS 4.3.2 value for the SFP level design to be consistent with the original design basis value and the applicable regulatory requirements. The proposed value will continue to ensure that inadvertent draining of the SFP will not result in the uncovering of spent fuel, as well as provide adequate shielding for personnel protection.

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

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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, paragraph (c), and accordingly, a finding of no significant hazards consideration is justified.

4.3 Conclusions

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

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

4.0-2

4.0 DESIGN FEATURES (continued)

4.3 Fuel Storage

4.3.1 Criticality

- 4.3.1.1 The spent fuel storage racks are designed and shall be maintained with:
- a. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1.2 of the USAR;
 - b. A nominal fuel assembly center to center storage spacing of 7 inches within rows and 12.25 inches between rows in the low density storage racks in the upper containment pool; and
 - c. For the fuel storage racks supplied by Nuclear Energy Services (NES), a nominal fuel assembly spacing of 6.4375 inches in the high density storage racks in the spent fuel pool or fuel cask storage pool. For the fuel storage racks supplied by Holtec International, a nominal fuel assembly spacing of 6.243 inches in the high density storage racks in the spent fuel pool or fuel cask storage pool.
- 4.3.1.2 The new fuel storage racks are designed and shall be maintained with:
- a. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1.1 of the USAR; and
 - b. A nominal fuel assembly center to center storage spacing of 7 inches within rows and 12.25 inches between rows in the new fuel storage racks.

4.3.2 Drainage



The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation ~~754~~ ft 0 inches.

4.3.3 Capacity

- 4.3.3.1 The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 3796 fuel assemblies. The fuel cask storage pool is designed and shall be maintained with a storage capacity limited to no more than 363 fuel assemblies.
- 4.3.3.2 No more than 160 fuel assemblies may be stored in the upper containment pool.
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