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

January 13, 2022

Mr. David P. Rhoades
Senior Vice President
Exelon Generation Company, LLC
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL  60555

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNITS 1 AND 2 – ISSUANCE OF AMENDMENT NOS. 342 AND 320 RE: MODIFYING THE LICENSING BASIS TO ALLOW FOR FULL CORE OFFLOAD WITH NO SHUTDOWN COOLING LOOP AVAILABLE DURING CERTAIN REFUELING OUTAGES (EPID L-2021-LLA-0112)

Dear Mr. Rhoades:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 342 to Renewed Facility Operating License No. DPR-53 and Amendment No. 320 to Renewed Facility Operating License No. DPR-69 for the Calvert Cliffs Nuclear Power Plant, Units 1 and 2 (Calvert Cliffs). These amendments authorize changes to the licensing basis for Calvert Cliffs in response to your application dated June 14, 2021, as supplemented by letters dated August 13 (superseding the June 14 application), October 25, November 4, and November 30, 2021.

These amendments approve changes to the Updated Final Safety Analysis Report and the Technical Requirements Manual for Calvert Cliffs to address a full core offload without the availability of being supplemented with one loop of the shutdown cooling system during certain refueling outages. These amendments also approve a change in calculational methodology used in the Calvert Cliffs spent fuel pool heat-up analysis.

A copy of our related safety evaluation is enclosed. A Notice of Issuance will be included in the Commission's monthly *Federal Register* notice.

Sincerely,

***/RA/***

Andrea G. Mayer, Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

Enclosures:
1. Amendment No. 342 to DPR-53
2. Amendment No. 320 to DPR-69
3. Safety Evaluation

cc: Listserv

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-317

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 342
Renewed License No. DPR-53

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

   A. The application for amendment by Exelon Generation Company, LLC (Exelon, the licensee) dated June 14, 2021, as supplemented by letters dated August 13 (superseding the June 14 application), October 25, November 4, and November 30, 2021, 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, by Amendment No. 342, the license is amended to authorize revision to the Calvert Cliffs Nuclear Power Plant, Unit 1, Updated Final Safety Analysis Report (UFSAR) and the Technical Requirements Manual (TRM), as set forth in the application dated June 14, 2021, as supplemented by letters dated August 13 superseding the June 14 application), October 25, November 4, and November 30, 2021.

3. This amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

James G. Danna

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Date: 2022.01.13 12:49:59 -05'00'

James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Date of Issuance: January 13, 2022

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-318

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 320
Renewed License No. DPR-69

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

   A. The application for amendment by Exelon Generation Company, LLC (Exelon, the licensee) dated June 14, 2021, as supplemented by letters dated August 13 (superseding the June 14 application), October 25, November 4, and November 30, 2021, 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 Amendment No. 320 to authorize revision to the Calvert Cliffs Nuclear Power Plant, Unit 2, Updated Final Safety Analysis Report (UFSAR) and the Technical Requirements Manual (TRM), as set forth in the application dated June 14, 2021, as supplemented by letters dated August 13 (superseding the June 14 application), October 25, November 4, and November 30, 2021.

3. This amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

James G. Danna

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Date: 2022.01.13 12:49:22 -05'00'

James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Date of Issuance: January 13, 2022

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

# SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

# RELATED TO MODIFYING THE LICENSING BASIS TO ALLOW FOR FULL CORE OFFLOAD WITH NO SHUTDOWN COOLING LOOP AVAILABLE DURING CERTAIN REFUELING OUTAGES

# AMENDMENT NO. 342 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-53

# AMENDMENT NO. 320 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-69

# EXELON GENERATION COMPANY, LLC

# CALVERT CLIFFS NUCLEAR POWER PLANT, UNITS 1 AND 2

# DOCKET NOS. 50-317 AND 50-318

## 1.0 INTRODUCTION

By application dated June 14, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21165A406), the licensee requested approval of an amendment related to spent fuel pool (SFP) operations. On July 13, 2021, the NRC held an observation public meeting with the licensee to discuss license amendment request (LAR) to gain a better understanding of the proposed changes, the justification supporting the proposed changes, and the planned operation of the SFP (including movement of spent fuel). A summary of the public meeting is available at ADAMS Accession No. ML21228A074. In response to NRC staff questions, the licensee identified several proposed changes that it did not intend to ask for NRC review and approval, because prior NRC approval is not required. The staff also identified proposed changes that did not have justification included in the LAR. As a result, the licensee stated that it would supplement the application to provide clarification.

Accordingly, by letter dated August 13, 2021, the licensee provided a superseding application, and by letters dated, October 25, 2021, November 4, 2021, and November 30, 2021 (ADAMS Accession Nos. ML21225A353, ML21298A043, ML21308A507, and ML21334A342, respectively), Exelon Generation Company, LLC (Exelon, the licensee) supplemented its request for changes to the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (Calvert Cliffs), licensing basis for the spent fuel pool cooling (SFPC) system. When the staff references the LAR in this Safety Evaluation (SE), it is referencing the August 13, 2021 superseding application. The supplements dated October 25, 2021, November 4, 2021, and November 30, 2021, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change NRC staff's original proposed no significant hazards consideration determination based on the superseding August 13, 2021 application as published in the *Federal Register* on November 2, 2021 (86 FR 60485).

From July 26, 2021, to September 9, 2021, the NRC staff conducted a regulatory audit to confirm certain information relied upon in the license amendment request (audit plan available at ADAMS Accession No. ML21200A074). The audit consisted of a document review via an electronic reading room and a series of video conferences with the licensee. A summary of the regulatory audit is available at ADAMS Accession No. ML21343A012.

In its August 13 letter, the licensee asked the NRC to approve: (1) the proposed permanent change to the SFPC system licensing design basis (reflected in the UFSAR) that would allow for a full core offload without the availability of being supplemented with one loop of the SDC system during certain refueling outages; (2) the change in calculational methodology used in the SFP heatup analysis (raising the maximum allowable SFP water temperature from 130°F to 150°F); and (3) changes to the Technical Requirements Manual (TRM).

## 1.1 Purpose of Proposed Change

For the 2022 winter refueling outage (RFO) (CC1R26) and certain future RFOs where a full core offload is planned, this amendment incorporates a new methodology in the SFPC licensing basis to obtain margin in heat removal capability by raising the maximum allowable Spent Fuel Pool water temperature from 130 degrees Fahrenheit (°F) to 150 °F. The Calvert Cliffs UFSAR (Reference 1) assumes the SFPC system is supplemented with one shutdown cooling heat exchanger from the offload unit. However, during RFOs, at least one loop of the SDC system is required to remove heat from the reactor coolant system per Technical Specification (TS) 3.9.4, “Shutdown Cooling (SDC) and Coolant Circulation-High Water Level” and is therefore not available to supplement the SFPC system. During the certain RFOs, the second SDC loop will be out of service (not operable) due to scheduled outage work. Thus, no SDC loop will be available during certain winter RFOs as supplemental support to cool the SFP. Instead of relying on supplemental cooling to keep the SFP water within the required temperatures associated with refueling activities, the licensee is requesting approval to take credit for the time it takes for the bulk SFP water to heat-up to 150 °F instead of the current limit of 130 °F.

# 2.0 REGULATORY EVALUATION

## 2.1 System Description

The SFP contains water with the proper dissolved concentration of boron and has the capacity to store 1830 fuel assemblies. The SFPC system is common to both units. The primary purpose of the SFPC system is to remove decay heat from the spent fuel stored in the spent fuel pool. The SFPC system is classified as a non-safety related system. The SFPC system assists in the safety related function of the SFP to keep the irradiated spent fuel adequately covered with water and to prevent the SFP from boiling.

The SFPC system is a closed-loop system consisting of two half-capacity pumps and two half-capacity heat exchangers in parallel, a bypass filter that removes insoluble particulates, and a bypass demineralizer that removes soluble ions. The SFPC heat exchangers are cooled by Service Water (SRW). The SRW heat exchangers are cooled by the saltwater cooling system, with supply and return to the Chesapeake Bay.

Connections are provided for tie-in from the SDC system to the SFPC system to provide for additional heat removal if 1830 fuel assemblies are contained in the pool. When the pressure in the SDC system is greater than the design pressure of the SFPC system, the SFPC system is isolated from the SDC system via two manual isolation valves.

The entire SFPC system is tornado-protected and is in a Seismic Category I structure. Borated makeup water comes from the refueling water tank. Non-borated makeup water comes from the demineralized water system.

## 2.2 Licensing Basis Changes

### 2.2.1 Updated Final Safety Analysis Changes

In Attachment 3 to the LAR supplement dated August 13, 2021, the licensee proposed to revise the Calvert Cliffs UFSAR Section 9.4.1, "Design Basis," as stated below.

From:

> The SFPC system is common to both units. The pool contains water with the proper dissolved concentration of boron and has the capacity to store 1830 fuel assemblies.
>
> The SFPC system is designed to remove the maximum decay heat expected from 1613 fuel assemblies, not including a full core offload. The maximum pool temperature in this case is 120 °F. The system is also capable of being used in conjunction with the SDC system to remove the maximum expected decay heat load from 1830 fuel assemblies, including a full core discharge. The maximum SFP temperature in this case is 130 °F.

To:

> The SFPC system is common to both units. The pool contains water with the proper dissolved concentration of boron and has the capacity to store 1830 fuel assemblies.
>
> The SFPC system is designed to remove the maximum decay heat expected from 1613 fuel assemblies, not including a full core off-load. The maximum pool temperature in this case is 120 °F. The system is capable of being used to remove the maximum expected decay heat load during winter RFO from 1830 fuel assemblies, including a full core discharge. The maximum SFP temperature in this case is 150 °F. The system is also capable of being used in conjunction with the SDC system to remove the maximum expected decay heat load, other than winter RFO, from 1830 fuel assemblies, including a full core discharge. The maximum SFP temperature in this case is 130 °F.

From:

> The total SFP decay heat load as a function of decay time is compared to the heat removal capacity from both loops of SFPC as a function of SRW temperature, supplemented with one loop of SDC to show what time after shutdown is acceptable for each SRW temperature condition to maintain the pool at a temperature at 130 °F. A maximum SRW temperature of 81 °F is required to support a minimum decay time of 4.5 days.

To:

> The total SFP decay heat load as a function of decay time is compared to the heat removal capacity from both loops of SFPC as a function of SRW temperature, supplemented with one loop of SDC to show what time after shutdown is acceptable for each SRW temperature condition to maintain the pool at a temperature at 130 °F. A maximum SRW temperature of 81 °F is required to support a minimum decay time of 4.5 days.
>
> For full core offloads with SRW temperature equal to or below 50 °F, two loops of SFPC is acceptable to maintain the pool at a temperature of 150 °F or lower. For the SRW temperature of 50 °F, a minimum decay time of 5.86 days is required to maintain the pool within the temperature limit of 150 °F.

From:

> In the normal case (i.e., with no full-core off load), if one SFPC loop is lost, a decay time of 4.5 days and a maximum SRW temperature of 54 °F are required for the remaining SFPC loop to be able to remove the decay heat while maintaining the pool temperature at 155 °F. In the case of total loss of SFPC with 1613 fuel assemblies in the pool, it would take more than 9 hours to raise the pool temperature from 155 °F to 210 °F.

To:

> In the normal case (i.e., with no full-core off load), if one SFPC loop is lost, a decay time of 4.5 days and a maximum SRW temperature of 54 °F are required for the remaining SFPC loop to be able to remove the decay heat while maintaining the pool temperature at 155 °F. In the case of total loss of SFPC with 1613 fuel assemblies in the pool, it would take more than 9 hours to raise the pool temperature from 155 °F to 210 °F.
>
> In the case of total loss of SFPC with 1830 fuel assemblies in the pool, it would take 6.5 hours to raise the pool temperature from 150 °F to 212 °F.

### 2.2.2 Technical Requirement Manual Proposed Changes

The licensee proposes to add a new TRM Section 15.9.5, “Spent Fuel Pool (SFP) Cooling Heat Removal During Full Core Offloads,” which was provided as Attachment 2 to the LAR supplement dated August 13, 2021. The proposed changes provide parameters to be met for full core offloads to be conducted, including the number of fuel assemblies offloaded, time after shutdown, SRW temperature, number of operable trains of the SFPC system, SFP initial temperature, and SDC system availability. If limits are not met, movement of irradiated fuel assemblies from the reactor to the SFP will be immediately suspended, and actions will be immediately initiated to restore the plant to within limits. If the SDC system is available to support the full core offloads, new section TRM 15.9.5 will not be entered.

### 2.2.3 Calculational Methodology Change

The change in calculational methodology is described in Section 3, “Technical Evaluation,” of Attachment 1 to the LAR supplement dated August 13, 2021. The calculational change raises the maximum allowable SFP water temperature from 130 °F to 150 °F, which provides more time for SFP temperature rise while one loop of SDC is not available during a full core offload.

## 2.3 Regulatory Requirements and Guidance

Title 10 to the *Code of Federal Regulations* (10 CFR), Section 50.90, "Application for amendment of license, construction permit, or early site permit," requires that whenever a holder of a license wishes to amend the license, including TSs in the license, an application for amendment must be filed, fully describing the changes desired. Under 10 CFR 50.92(a), determinations on whether to grant an application for a license amendment are to be guided by the considerations that govern the issuance of initial licenses or construction permits to the extent applicable and appropriate. Both the common standards for licenses in 10 CFR 50.40(a) (regarding, among other things, consideration of the operating procedures, the facility and equipment, the use of the facility, and other technical specifications, or the proposals) and those specifically for issuance of operating licenses in 10 CFR 50.57(a)(3), provide that there must be reasonable assurance that the activities at issue will not endanger the health and safety of the public, and that the applicant will comply with the Commission's regulations.

Pursuant to 10 CFR 50.34(b), the final safety analysis report (which was originally submitted as part of the application for an operating license) shall include information that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems, and components and of the facility as a whole. Per 10 CFR 50.34(b)(2), the FSAR shall include:

> A description and analysis of the structures, systems, and components of the facility, with emphasis upon performance requirements, the bases, with technical justification therefor, upon which such requirements have been established, and the evaluations required to show that safety functions will be accomplished. The description shall be sufficient to permit understanding of the system designs and their relationship to safety evaluations.
>
> > (i) For nuclear reactors, such items as the reactor core, reactor coolant system, instrumentation and control systems, electrical systems, containment system, other engineered safety features, auxiliary and emergency systems, power conversion systems, radioactive waste handling systems, and fuel handling systems shall be discussed insofar as they are pertinent.

Per 10 CFR 50.34(b)(6)(iv), the FSAR shall include "[p]lans for conduct of normal operations, including maintenance, surveillance, and periodic testing of structures, systems, and components."

Regulations in 10 CFR 50.68, "Criticality Accident Requirements," establishes design and analysis requirements for spent fuel storage racks in order to prevent a criticality accident. Each holder of an operating license for a nuclear power reactor issued under 10 CFR Part 50 shall comply with either the requirements of 10 CFR 50.68(b) or those described in 10 CFR 70.24.

As stated in the Calvert Cliffs UFSAR, Appendix 1C, "AEC Proposed General Design Criteria for Nuclear Power Plants," the principal design criteria for Calvert Cliffs were developed in consideration of the seventy General Design Criteria (GDC) for Nuclear Power Plant

Construction Permits proposed by the Atomic Energy Commission in a proposed rulemaking published for 10 CFR 50 in the *Federal Register* on July 11, 1967.

Draft GDC 2 requires, in part, that seismic Category 1 SSCs be designed to withstand, without loss of the capability to protect the public, the additional forces that might be imposed by natural phenomena such as earthquakes, tornadoes, flooding conditions, winds, ice, and other local site effects with appropriate combinations of other applicable loads. While the licensee listed this draft GDC as applicable to this LAR, the NRC staff did not find this GDC to be applicable to the scope of this LAR review because the licensee is not proposing a change to the design or the structure of the SFP, SFPC system, or SDC system.

Draft GDC 4, "Sharing of Systems (Category A)," states that reactor facilities shall not share systems or components unless it is shown that safety is not impaired by the sharing. This correlates to GDC 5, "Sharing of Structures, systems, and components," of Appendix A to 10 CFR Part 50. While the licensee listed this draft GDC as applicable to this LAR, the NRC staff did not find this GDC to be applicable to the scope of this LAR review because the licensee is not requesting any changes to how the SFPC or SDC systems are shared between the two units.

Draft GDC 67, "Fuel and Waste Storage Decay Heat (Category B)," states that reliable decay heat removal systems shall be designed to prevent damage to the fuel in storage facilities that could result in radioactivity release to plant operating areas or the public environs. This correlates to GDC 61, "Fuel Storage and Handling and Radioactivity Control," of Appendix A to 10 CFR Part 50. While the licensee listed this draft GDC as applicable to this LAR, the NRC staff did not find this GDC to be applicable to the scope of this LAR review because the licensee did not propose a change to the design or heat removal capacity of the SFPC or SDC systems.

The NRC staff consulted the following guidance in this review:

Regulatory Guide (RG) 1.13, Revision 2, "Spent Fuel Pool Storage Facility Design Basis," addresses guidelines for conformance with the GDCs that are relevant to the design of spent fuel storage facilities.

NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition" (the SRP), Section 9.1.3, "Spent Fuel Pool Cooling and Cleanup System," contains the current acceptance criteria for the SFCP system.

## 3.0 TECHNICAL EVALUATION

In the LAR, Exelon requested NRC approval to make a permanent change to the Calvert Cliffs SFPC system licensing design basis that would allow for a full core offload without the availability of being supplemented with one loop of the SDC system during certain outages, including changes to the UFSAR and a new section of the TRM. The licensee also proposed a change in the calculational methodology for the SFP heat-up analysis and to allow maximum SFP temperature to increase from 130 °F to 150 °F.

### 3.1 Reactor Core and Spent Fuel Pool Decay Heat Analysis

The NRC staff compared the licensee's decay heat load evaluation against review criteria in Section 9.1.3, "Spent Fuel Pool Cooling and Cleanup System," of the SRP. Review procedure

1.H.i of this SRP section recommends that the NRC staff consider whether the method of performing decay heat load calculations uses a conservative model that evaluates multiple fission product groups and considers offload size, decay time, power history, and inventory of previously discharged assemblies. The licensee's consideration of various offload sizes, decay times, power histories, and inventories of previously discharged assemblies is discussed in Section 3.2 and Table 2 of the of the LAR.

A full core offload is modeled, consistent with the purpose of the LAR. The NRC staff considers the modeled offload size to be realistic. Decay time is explicitly accounted for in the licensee's method. Further, conditions in Table 1 of proposed TRM Section 15.9.5 (attachment 2 of the LAR supplement dated August 13, 2021) ensure that modeled decay time is conservatively less than or equal to the actual decay time experienced by the fuel during future refueling outages.

The modeled inventory of previously discharged assemblies is described in Table 1 of the LAR as supplemented. The licensee assumes that the SFP contains the maximum number of previously discharged assemblies that would still permit a full core offload. The licensee also makes conservative assumptions about the time elapsed since these assemblies were discharged. For example, in cases 1, 2, 3, and 7 (as indicated in Table 2 of the LAR), the licensee assumes that 1488 assemblies have been in the SFP for 2 years at the beginning of the analysis. Since each core is composed of 217 assemblies and the cores are refueled at two-year intervals (Reference 2), this spent fuel inventory cannot be generated by the two Calvert Cliffs units under reasonable operating conditions. Some fuel in the SFP will be older, and therefore, will generate less decay heat. Therefore, the staff determined that this modeling approximation is conservative.

Chapter 9.4.1 of the Calvert Cliffs USFAR (Reference 1) indicates that decay heat is evaluated assuming that assemblies have been irradiated at 2738 megawatts thermal (MWt). The NRC staff considers this to be realistic, as the rated thermal power for each unit is 2737 MWt. The NRC staff reviewed details of the licensee's calculation during a regulatory audit and confirmed that additional conservatisms are present in the evaluation of power history.

As stated in Section 1.1 of the LAR, the licensee's decay heat model uses the SAS2H/ORIGEN-S sequence of the SCALE 4.4 code system. This method allows for evaluation of multiple fission product groups and has been used to evaluate decay heat load in previous licensing actions approved by the NRC staff involving spent fuel pool cooling applications (Reference 3).

Review position 1.H.i in Section 9.1.3 of the SRP states that the NRC staff should consider whether calculations were performed using a conservative model. The staff review was focused on Case 3, since conditions in Table 1 of proposed TRM Section 15.9.5 were developed based on this case. The NRC staff compared the licensee's calculated decay heat load to that calculated using American National Standards Institute/American Nuclear Society (ANSI/ANS) Standard 5.1-1979, "Decay Heat Power in Light Water Reactors," (Reference 4), as referenced in Section 9.2.5 of the SRP. The NRC staff found that the licensee's model, combined with their assumptions about SFP inventory, yields conservative predictions of decay heat with respect to the ANSI/ANS 5.1-1979 standard.

In support of the evaluation described in Section 3.2 of this SE, the NRC staff also used the ANSI/ANS 5.1-1979 standard to evaluate decay heat load after the full core offload is complete, assuming an R-factor of 0.7 and an uncertainty of 10 percent. The staff performed calculations using the irradiation history and SFP inventory described in Chapter 9.4 of the Calvert Cliffs

UFSAR, and staff found agreement with the decay heat value quoted in this section of the UFSAR. Based on this analysis, the staff estimated total decay heat loads 5.18, 10.20, and 18.48 days after shutdown to be 48.6, 39.4, and 32.9 million British thermal units per hour (Btu/hr), respectively. Decay heat loads 10.20 and 18.48 days after shutdown are 81 percent and 68 percent (respectively) of the decay heat 5.18 days after shutdown. The significance of these values is discussed in Sections 3.2 and 3.4 of this SE.

Because the licensee's decay heat predictions are conservative; evaluate multiple fission product groups; and consider offload size, decay time, power history, and inventory of previously discharged assemblies; NRC staff finds that these calculations are consistent with the guidance in Section 9.1.3 of the SRP and are, therefore, acceptable.

## 3.2 Spent Fuel Pool Heat-up Analysis

The purpose of the licensee's SFP heat-up analysis, as stated in Section 3.2 of Attachment 1 of the LAR supplement dated August 13, 2021, is to determine the amount of delay time, after shutdown, required before starting the fuel discharge to the SFP using typical conditions during February, as this is when the Spring 2022 RFO will begin.

The design inputs used in the licensee's analysis are abbreviated below from Section 3.2 of LAR supplement dated August 13, 2021:

- The maximum temperature of SFP is 150 °F
- The full core decay heat as a function of time since shutdown
- The heat removal capacity of the SFP is taken from a separate licensee calculation (Calculation CA03959 Rev. 0000, "Spent Fuel Pool Heat Removal Capability")
- There are 217 fuel assemblies in a full core load
- The maximum capacity of the SFP storage tray is 1830 fuel assemblies
- The initial SFP temperature for February is taken to be 92 °F, the maximum temperature logged for February of 2021 from plant data
- The rate of fuel movement to the SFP is taken to be six fuel assemblies per hour

Using the above inputs, 1613 (1830 minus 217) fuel assemblies were determined to exist in SFP at the initiation of discharging fuel into the SFP. Of 1613 fuel assemblies, 1488 fuel assemblies were assumed to be 2 years old and the remaining 125 fuel assemblies were assumed to be 60 days, 330 days, or 2 years old, respectively under three different scenarios. Of the three scenarios, the bounding scenario of 125 fuel assemblies that are 60 days old and 1488 fuel assemblies that are two years old had a decay heat of 20.2 million Btu/hr.

In Section 3.2 of the LAR supplement dated August 13, 2021, the licensee stated that it used the following assumptions in its analysis:

- The water level in the SFP was assumed to be constant at 79,000 cubic feet. This is conservative as it takes no credit for the addition of cool water to maintain level lost to evaporation or for the cooling associated with evaporation.
- The fuel assemblies stored in the SFP are all assumed to be the bounding case of Westinghouse VAP fuel.
- At the beginning of the core offload, the SFP contains 1613 fuel assemblies with each fuel assembly subjected to different periods of irradiation and decay as noted before. However, further decay of those assemblies is conservatively ignored.

- The SRW temperature is assumed to be 5 °F warmer than the Chesapeake Bay water temperature of 42 °F in February, based on licensee's engineering judgment and a design temperature difference of 5 °F on the SRW heat exchangers, giving the SRW temperature in the analysis as 47 °F. However, the licensee conservatively used a higher SRW temperature of 50 °F in the analysis.

The licensee calculated the rise in the SFP temperature using the conservation of energy (energy balance) in the SFP and assuming the mass of its water to be a constant. The fuel assemblies are assumed to be moved into the SFP at a rate of six fuel assemblies per hour or one fuel assembly every 10 minutes. The decay heat associated with a fuel assembly is added every 10 minutes until the entire quantity of fuel assemblies have been moved to the SFP (either a partial load or full core offload of 217 fuel assemblies).

The licensee analyzed seven different cases using an SRW temperature of 50 °F, and an initial SFP temperature of 92 °F, as stated above. Of the seven cases described in the LAR, Case 1 is a bounding scenario in which two SFP cooling loops are assumed to operate, a full core offload occurs while there is also a partial offload of 125 fuel assemblies in the pool that are 60 days old, and the rest of the stored fuel is assumed to be two years old. The results of Case 1 showed that when fuel discharge to the SFP begins 4.36 days after shutdown, the discharge would complete at 5.86 days and the SFP temperature does not exceed 150 °F. The SFP temperature reaches 150 °F at 8.20 days (i.e., 2.34 days after discharge is complete). This shows that when full core offload to the SFP begins 4.36 days after shutdown with two SFPC loops operating, the SFP temperature would stay within the proposed limit of 150 °F.

As stated in the audit summary report, the NRC staff reviewed the calculation inputs, assumptions, and methodology, and performed spot check calculations to verify the information relied up in the LAR. Based on the staff's review of the LAR, as well as the confirmatory calculations, the staff finds that the licensee's SFP heat-up analysis and methodology are acceptable because they are consistent with SRP Section 9.1.3 and the because the change in operation of the SFP (maintaining SFP temperature below the proposed limit of 150 °F) continues to provide reasonable assurance that adequate heat removal capacity is maintained for the SFPC system.

### 3.3 Structural Integrity of the Spent Fuel Pool

Section 3.3 of the LAR supplement dated August 13, 2021, states that the structural analysis for the SFP does not require a change as long as the maximum bulk water temperature remains below 150 °F, and it also considers the maximum temperature of 212 °F for an RFO. Section 3.3 of the LAR supplement dated August 13, 2021, also states that the concrete and rebar stresses will still remain within allowable limits.

The NRC staff reviewed the information provided in the LAR and during the regulatory audit, identified the need for additional information regarding apparent discrepancies between the current licensing basis maximum stresses on the SFP walls and liner per the UFSAR and the maximum stresses that were included in calculations that were reviewed during the audit. By email dated October 5, 2021, the NRC issued a request for additional information (RAI) (ADAMS Accession No. ML21287A093). By letters dated October 25, 2021, November 4, 2021, and November 30, 2021, the licensee responded to the RAI.

In its response dated October 25, 2021, the licensee described two differing methodologies used in the SFP wall stress calculation, and provided concrete and reinforcing steel stresses at

150 °F and 212 °F SFP water temperatures, respectively. In its responses dated November 4, 2021, and November 30, 2021, the licensee provided the calculated thermal stress on the SFP liner at 155 °F and at 212 °F, respectively. In both cases (SFP walls and SFP liner), the licensee provided the applicable code requirement and the calculated stresses, and the calculated stresses were less than the allowable stresses.

The NRC staff finds the licensee's RAI responses acceptable because: (1) the calculated concrete and reinforcing steel stresses for the design load combinations including thermal loads at 150 °F and 212 °F SFP water temperatures are within the allowable stress limit of the American Concrete Institute (ACI) 318-63 code; and (2) the calculated thermal stresses on the SFP liner for the design load combinations including thermal loads at 155 °F and at 212 °F SFP water temperatures are within the allowable stress limit. The staff concludes that the structural integrity of the SFP will be maintained as a result of the change in operation of the SFP.

### 3.4 Reliability Analysis

The licensee states in Section 4.1 of Attachment 1 to the LAR supplement dated August 13, 2021, that "[t]he CCNPP SFPC system was not originally licensed to single failure criteria and is not safety related." Nevertheless, the licensee provided a single failure analysis for the SFPC system. The licensee states the following in Section 3.8 of Attachment 1 to the LAR :

> In a refueling outage if one train of SFPC is lost while the other train of SDC is still out of service for maintenance, the SFP temperature would be monitored, and appropriate actions would be taken per alarm manual 1C13 if a SFP high temperature alarm would be received. One of the actions in the alarm manual directs operators to AOP-06F, "Spent Fuel Pool Cooling System Malfunctions," [AOP-6F, "Spent Fuel Pool Cooling System Malfunctions," Revision 00701] which provides guidance to consider aligning SDC if the unit is defueled per OI-03B-1(2), "Shutdown Cooling," [OI-03B-1(2), "Shutdown Cooling," Revisions 03400(03100)]. Section 6.13 of OI-03B-1(2) addresses aligning the SDC to the SFP (Attachment 7). This alignment can occur relatively quickly with the spool piping connections preinstalled prior to offloading the core.

The licensee states that if a total loss of SFPC occurs with 1830 fuel assemblies in the pool, it would take a minimum of 6.5 hours to raise the pool temperature from 150 °F to 212 °F and that the maximum boil-off rate for this condition is 93.9 gallons per minute (gpm). The licensee states that the time to heat the bulk water to boiling provides sufficient time to establish an alternate means of cooling, and the makeup rate exceeds the rate of water loss due to boil-off. Calvert Cliffs UFSAR Section 9.4.4 states that "[m]akeup water can be supplied indefinitely to the SFP at a rate of at least 150 gpm," which is higher than the maximum boil-off rate of 93.9 gpm. UFSAR Section 9.4.4 describes the makeup water flow path as follows:

a. Source - Well water
b. Portable Makeup Demineralizers
    - Typical capacity 150 gpm or more
c. Demineralized Water Storage Tank
    - Storage capacity 350,000 gallons
d. Four Reactor Coolant Makeup Pumps (Normally run one per unit)
    - Capacity 165 gpm each, less the amount required for reactor coolant makeup

e. Two RWTs (One per unit)
    - Storage capacity 420,000 gallons
    - Required to have 400,000 gallons during operation
    - During refueling this water has been transferred to the refueling pool where it is also available for pumping if conditions permit
f. Two Spent Fuel Cooling Pumps (One per RWT)
    - Capacity 1390 gpm each
g. Spent Fuel Pool

As stated in the audit report, the NRC staff reviewed supporting analyses for the SFP heat-up. The staff reviewed inputs, assumptions, methodology, and verified the time to boil-off from the time that the SFP reaches 150 °F. The staff also verified the boil-off rate by calculating it using the decay heat generated in the SFP and the properties of water at 50 °F.

The NRC staff reviewed the possible recovery from a loss of one SFPC loop occurring with 1830 fuel assemblies in the pool. If full core offload is complete, the operators will be able to align the SDC loop, which was being used to remove decay heat from the reactor vessel, to the SFPC. However, if the core offload is not complete, aligning SDC to the SFPC system will not be an option. With only SFPC one loop available with the full core offload not complete, the pool could reach saturation temperature (212 °F, the boiling point of water at atmospheric pressure) and makeup will be available to maintain the SFP level. The makeup rate will be less than that for the total loss of SFPC (i.e., 93.9 gpm), and the plant has a makeup capability of 150 gpm.

The NRC staff considered the effects of events that affect SFPC system operation, including failure of a SFPC pump or a loss of electrical power. The decay heat of the fuel in the SFP will drop with time due to decay, and this reduction in decay heat reduces the cooling requirements and the makeup flow necessary to maintain SFP water inventory constant. Once the decay heat generation rate in the pool has dropped to a level at or below the cooling capacity of a single cooling loop, then the SFP temperature can be maintained at or below the saturation temperature, and significant makeup water will no longer be needed. As discussed in Section 3.1 of this SE, the staff estimated that one SFPC loop would be able to maintain the SFP below saturation temperature beginning about 10.20 days after shutdown with SRW temperature at 50 °F. Under otherwise similar conditions, the staff estimated that one SFPC loop would be able to maintain the SFP below 185 °F 18.48 days after shutdown.

Given the low likelihood of pump failure during the short period of time two pumps are required for adequate cooling and the potential availability of the one functional SDC loop, there is reasonable assurance that SFP cooling function would be maintained. The large inventory of water in the SFP and the heat-up time continue to provide reasonable assurance that SFPC functionality would be restored well before the SFP reached saturation conditions.

Based on its review of the LAR, review of calculations during the regulatory audit, and the staff's confirmatory analysis, the NRC staff determined that in an RFO, if SFPC is lost or degraded while the other train of SDC is out of service for maintenance, there is reasonable assurance that operators would have sufficient time before the SFP reached saturation conditions to restore SFP cooling or align water sources for makeup to the SFP, and is, therefore, acceptable.

3.5 Impact of SFP Temperature Rise on the Criticality Analyses

In its LAR, the licensee proposed to increase the allowable bulk water temperature in the SFP from 130 °F to 150 °F. The criticality analyses of record were performed assuming a water temperature (and resulting density) corresponding to the highest reactivity, as this will be the most limiting condition (References 5 and 6). Water temperatures ranging from 40 °F to 155 °F were considered. As the proposed allowable SFP temperature is within this range, the proposed operating condition is less limiting than (or as limiting as) conditions considered in the analyses of record. Therefore, the NRC staff finds that the existing criticality analyses remain applicable and that the provisions of 10 CFR 50.68 will continue to be met after the proposed change.

3.6 Fuel Handling Accident Radiological Analysis

In Section 3.6 of the LAR supplement dated August 13, 2021, the licensee stated that the requested changes to the licensing basis do not impact the fuel handling accident analysis. The staff reviewed the LAR to verify the licensee's assertion that the radiological accident analysis for the fuel handling accident would not be impacted. In reviewing the current licensing basis, the staff found that the licensee currently meets the alternative source term requirements in 10 CFR 50.67. Per Section 15.9.1 of the TRM and Chapter 14 of the Calvert Cliffs USFAR, the licensee is currently required to wait 72 hours after the reactor is subcritical before moving irradiated fuel from the core. This decay time is credited in the fuel handling accident radiological analysis. While the LAR discusses meeting heat load requirements even if initiating fuel movement prior to 72 hours, the licensee is not requesting any adjustments to the 72 hour required decay time specified in the TRM 15.9.1 or the UFSAR. Therefore, following implementation of the LAR, the licensee will still be required to allow 72 hours after the reactor is subcritical before moving irradiated fuel from the core.

The LAR proposes changes to spent fuel pool temperature, but temperature is not an input to the fuel handling accident radiological analysis. In addition, the LAR does not propose any changes to refueling canal or spent fuel water depth or any other parameter impacting the fuel handling accident analysis. Accordingly, the staff concludes that the changes proposed in the LAR will not impact the fuel handling accident radiological analysis and are, therefore, acceptable.

3.7 Proposed Changes to the Calvert Cliffs UFSAR

In Attachment 3 to the LAR, the licensee proposed to add the following sentence to Section 9.4.1, "Design Basis," of the Calvert Cliffs UFSAR:

> The system is capable of being used to remove the maximum expected decay heat load during winter RFO from 1830 fuel assemblies, including a full core discharge. The maximum SFP temperature in this case is 150 °F.

As discussed in Section 2.2 of the LAR (and provided in Section 3.2 of this SE), the initial conditions for the licensee's SFP heatup calculational methodology include (1) a maximum of 1830 fuel assemblies in the SFP and (2) a maximum SFP temperature of 150 °F. Sections 3.1, 3.2, and 3.4 of this SE provide the staff's evaluation of the SFP decay heat analysis, SFP heat up analysis, and reliability analysis, respectively, of these changes to the licensing basis. Based on the results of the staff's evaluation in the aforementioned sections of this SE, the staff finds that this proposed revision to the UFSAR is acceptable.

The licensee also proposed to add the following sentence to Section 9.4.1 of the UFSAR:

> For full core offloads with SRW temperature equal to or below 50 °F, two loops of SFPC is acceptable to maintain the pool at a temperature of 150 °F or lower. For the SRW temperature of 50 °F, a minimum decay time of 5.86 days is required to maintain the pool within the temperature limit of 150 °F.

This UFSAR revision is based on the more limiting Case 1 from Section 3.2 of the LAR. The minimum decay time of 5.86 days corresponds to the abnormal case where 125 existing assemblies in the SFP have a decay time of 60 days. The staff evaluated Case 1 of the LAR in Section 3.2 of this SE. Based on the results of the staff's evaluation in Section 3.2 of this SE, the staff finds that this proposed revision to the UFSAR is acceptable.

Lastly, the licensee proposed to add the following sentence to Section 9.4.1 of the UFSAR:

> In the case of total loss of SFPC with 1830 fuel assemblies in the pool, it would take 6.5 hours to raise the pool temperature from 150 °F to 212 °F.

The licensee provides this same statement in Section 3.8 of the LAR, "Single Failure Analysis." In Section 3.4 of this SE, the staff evaluated the licensee's single failure analysis, concluding that in an RFO, if SFPC is lost or degraded while the other train of SDC is out of service for maintenance, there is reasonable assurance that operators would have sufficient time before the SFP reached saturation conditions to restore SFP cooling or align water sources for makeup to the SFP. Based on the results of the staff's evaluation in Section 3.4 of this SE, the staff finds that this proposed revision to the UFSAR is acceptable.

### 3.8 Proposed Changes to the Calvert Cliffs TRM

The licensee proposed the following as the Technical Normal Condition (TNC) for new Section 15.9.5, "Spent Fuel Pool (SFP) Cooling Heat Removal During Full Core Offloads:"

> The Spent Fuel Pool Cooling system is required to have cooling capacity to maintain temperature in the Spent Fuel Pool >50 °F and <150 °F during a full core offload when Shutdown Cooling system is initially unavailable to assist with Spent Fuel Pool Cooling.
>
> a. The SFP water temperature shall be >50 °F and <150 °F;
> b. Two SFP Cooling Systems shall be OPERABLE, each commensurate with the SFP heat load; and
> c. The combination of Service Water ($T_{SRW}$) temperature and time after shutdown shall be met per Table 1 below.

Table 1, "Addition of recently irradiated fuel assemblies to the Spent Fuel Pool using Two SFP Cooling Loops," states:

| Time to Start Discharge (days) | Time to Complete Discharge (days) | $T_{SRW}$ (°F) | Initial SFP Temperature (°F) |
|---|---|---|---|
| 3 | 4.5 | ≤ 50 | ≤ 92 |

The required SFP water temperature of >50 °F and <150 °F is bounded by the SFP temperatures considered in the criticality analysis (see Section 3.5 of this SE), and the maximum temperature is the same as that indicated in the proposed revision to Section 9.4.1 of the UFSAR. Requiring two SFPC system loops to be operable aligns with proposed revisions to Section 9.4.1 of the UFSAR which states that two SFPC loops are adequate to maintain SFP temperature below 150 °F for a full core offload (see Section 3.2 of this SE). Regarding the values in Table 1, the time to start discharge is the same as the 72-hour decay time required by Chapter 14 of the UFSAR and TRM Section 15.9.1 (discussed in Section 3.6 of this SE). The time to complete discharge is 4.5 days, which aligns with the assumption of a full core offload (217 rods) at 6 rods moved to the SFP per hour (see Section 3.2 of this SE), which totals 36 hours or 1.5 days after starting the discharge. This decay time and time to complete discharge were developed to reflect normal operating conditions, assuming that the newest fuel in the SFP (excluding the full core offload) has had 330 days to decay. The required service water temperature of less than or equal to 50 °F and the initial SFP temperature less than or equal to 92 °F are both initial conditions of the licensee's SFP heatup analysis (see Section 3.2 of this SE). Because the parameters of TNC 15.9.5 are in agreement with either existing or proposed revisions to the Calvert Cliffs UFSAR, or are the same as the initial conditions for the calculational methodologies that the NRC staff evaluated in preceding subsections of Section 3 of this SE, the NRC staff finds the TNC 15.9.5 acceptable. The NRC staff also finds the Applicability of TNC 15.9.5, "during full core offload and until core is reloaded," acceptable because it includes the full time period between first discharge to the SFP and until the core is fully reloaded.

For Condition A, "SFP temperature not within limit," the licensee proposes to immediately suspend movement of spent fuel to the SFP and immediately initiate action to restore SFP temperature to within limit. The NRC staff finds these contingency measures and their completion time to be acceptable because no additional source of decay heat will be added to the SFP while the temperature is not within limits, and the licensee must take actions immediately to restore SFP temperature.

For Condition B, "One required SFP Cooling System inoperable," the licensee proposes to immediately suspend movement of spent fuel to the SFP, immediately initiate action to restore a second SFPC system to operable status and restore a second SFPC loop within three hours. The NRC staff finds the contingency measures and completion times of Nonconformance B acceptable because no additional source of decay heat will be added to the SFP while a second loop of SFPC is not available to cool the SFP and because immediate action is initiated to restore SFP cooling capacity. Because the time to boil (SFP temperature rise from 150 °F to 212 °F) with the loss of both SFPC pumps is 6.5 hours, the completion time of three hours to restore a second loop of SFPC conservatively allows time for the licensee to restore adequate SFP cooling.

For Condition C, "combination of Service Water temperature ($T_{SRW}$) and minimum time after shutdown not met," the licensee proposes to immediately suspend movement of spent fuel from the reactor to the SFP. The NRC staff finds this contingency measure acceptable because the parameters of Table 1 of TNC 15.9.5 reflect normal operating conditions, assuming that the newest fuel in the SFP (excluding the full core offload) has had 330 days to decay, which is Case 3 of the licensee's SFP heatup analysis and leads to a max SFP temperature within the 150 °F limit. Operating outside the parameters of Table 1 has the potential to exceed the maximum SFP temperature limit.

For Condition D, “Contingency Measures and Completion Time of Condition A, B, or C not met,” the contingency measure is to see Section 15.0.3, “Failure to Meet a TNC or [Technical Verification Requirement] TVR,” of the TRM. This section provides guidance that when TNCs or TVRs are not met, appropriate actions shall be taken as necessary to provide assurance of continued safe plant operations and that an assessment of reasonable assurance of safety shall be conducted. The NRC staff find this contingency measure acceptable because it ensures the licensee takes prompt action to restore conditions or equipment required by TNC 15.9.5 and ensures the plant operates safety.

Lastly, the licensee includes TVRs for items a, b, and c of TNC 15.9.5. TVR 15.9.5.1 requires the licensee to verify that the SFP temperature is within limit every 12 hours. The NRC staff notes that in Section 3.8 of the LAR, the licensee states that appropriate actions would be taken if a SFP high temperature alarm was received. This provides additional assurance that a high temperature condition in the SFP would be detected between the 12-hour intervals of this TVR. TVR 15.9.5.2 requires the licensee to verify two SFP Cooling Systems are operable, each commensurate with the SFP heat load associated with the full core offload at a frequency of once prior to commencing discharge to the SFP and every 12 hours thereafter. For Case 3 of the SFP heatup analysis, assumed to be the normal operating condition (and what TRM 15.9.5 is based on), time to reach 150 °F is more than two days, ensuring that a 12-hour frequency would provide sufficient time to diagnose the condition and initiate actions to restore SFPC.

TVR 15.9.5.3 requires the licensee to verify that the combination of the Service Water temperature ($T_{SRW}$) and minimum time after shutdown are met at a frequency of once prior to commencing discharge to the SFP and every 24 hours thereafter. This frequency provides at least one verification of core offload conditions before offload would likely be complete (36 hours to complete full core offload).

The NRC staff finds these TVRs and associated frequencies acceptable because they provide adequate time to discover a nonconformance and take action per the contingency measures of TNC 15.9.5.

## 3.8 Technical Conclusion

The NRC staff reviewed the LAR as supplemented and performed an audit to review the supporting documents referenced in the application. The staff reviewed the reactor core and SFP decay heat analysis, SFP heat-up analysis, structural integrity of the spent fuel pool, reliability analysis for the SFPC system, and the impact of SFP temperature rise on the criticality analyses. The NRC staff also reviewed the proposed revisions to the Calvert Cliffs UFSAR and the new proposed section of the TRM. The staff finds that the reactor core and SFP decay heat analysis is consistent with the acceptance criteria in Section 9.1.3 of the SRP, and is, therefore, acceptable. The staff review finds that the proposed changes with respect to the SFP heatup analysis and SFP structural integrity provide reasonable assurance of public health and safety and therefore, continue to satisfy 10 CFR 50.40(a) and 10 CFR 50.57(a)(3). Because the existing criticality analyses remain applicable to the operating conditions permitted by the proposed amendment, the NRC staff finds that the proposed change is consistent with the provisions of 10 CFR 50.68. Lastly, the staff finds that the proposed revisions to the licensing basis in the UFSAR and the TRM are acceptable because, as reflected in the respective technical evaluation sections of this SE, the staff found that the changes to the operation of the SFP continue to provide reasonable assurance of public health and safety and therefore, satisfy

10 CFR 50.40(a) and 10 CFR 50.57(a)(3). Therefore, the staff finds that the proposed revisions to the Calvert Cliffs UFSAR and TRM are acceptable.

## 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Maryland State official was notified of the proposed issuance of the amendment on December 2, 2021. The State official had no comments.

## 5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement 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 amendments 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 published in the *Federal Register* on November 2, 2021 (86 FR 60485). Accordingly, the amendments 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 amendments.

## 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.

## 7.0 REFERENCES


1. Updated Final Safety Analysis Report, UFSAR, Rev 51 Chapter 9.4 “Spent Fuel Pool Cooling System” (ADAMS Accession No. ML19263B871).

2. Updated Final Safety Analysis Report, UFSAR, Rev 51 Chapter 3.1 “General Design Summary” (ADAMS Accession No. ML19263B854).

3. Lyon, Carl F., U.S. Nuclear Regulatory Commission, letter to J. V. Parrish, Energy Northwest, February 8, 2007 (ADAMS Accession No. ML070180741).

4. American National Standards Institute/American Nuclear Society, ANSI/ANS 5.1-1979, “Decay Heat Power in Light Water Reactors,” ANS, LaGrange Park, IL.

5. Katz, Peter E., Constellation Generation Group, LLC, letter to U.S. Nuclear Regulatory Commission, May 1, 2003 (ADAMS Accession No. ML031280338).

6. Vanderheyden, George, Constellation Generation Group, LLC, letter to U.S. Nuclear Regulatory Commission, September 30, 2003 (ADAMS Accession No. ML033140578).

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Date: January 13, 2022

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNITS 1 AND 2 – ISSUANCE OF AMENDMENT NOS. 342 AND 320 RE: MODIFYING THE LICENSING BASIS TO ALLOW FOR FULL CORE OFFLOAD WITH NO SHUTDOWN COOLING LOOP AVAILABLE DURING CERTAIN REFUELING OUTAGES (EPID L-2021-LLA-0112) DATED JANUARY 13, 2022

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