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52-026

ND-17-1145
10 CFR 50.90
10 CFR 52.63

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

Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4
Request for License Amendment and Exemption:
Changes to Containment Cooling and Spent Fuel Pool Makeup Strategies (LAR-17-021)

Ladies and Gentlemen:

Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC) requests an amendment to the combined licenses (COLs) for Vogtle Electric Generating Plant (VEGP) Units 3 and 4 (License Numbers NPF-91 and NPF-92, respectively). The requested amendment proposes changes to the Updated Final Safety Analysis Report (UFSAR) in the form of departures from the Plant-Specific Design Control Document (DCD) Tier 2 information and involves changes to the VEGP Units 3 and 4 plant-specific Tier 1 information (and associated COL Appendix C information) and to the VEGP Units 3 and 4 COL Appendix A, Technical Specifications. Pursuant to the provisions of 10 CFR 52.63(b)(1), an exemption from elements of the design as certified in the 10 CFR Part 52, Appendix D, Design Certification Rule, is also requested for the plant-specific DCD Tier 1 material departures.

The requested amendment proposes changes to plant-specific Tier 1 (and COL Appendix C) to revise the inspected volume for the spent fuel pool and cask loading pit, and make corresponding changes to the minimum volumes. A new Tier 1 inspection is also added for the cask washdown pit with appropriate acceptance criteria for its volume. The requested amendment also proposes changes to the Technical Specification reactor decay heat limits and spent fuel pool decay heat limits which reflect when various safety-related makeup paths are required to be available for containment cooling or spent fuel pool makeup.

Enclosure 1 provides the description, technical evaluation, regulatory evaluation (including the Significant Hazards Consideration) and environmental considerations for the proposed changes.

Enclosure 2 provides the background and supporting basis for the requested exemption.

Enclosure 3 identifies the requested changes and provides markups depicting the requested changes to the VEGP Units 3 and 4 licensing basis documents.

Enclosure 4 provides conforming Technical Specification Bases changes for information only.

This letter contains no regulatory commitments. This letter has been reviewed and determined not to contain security related information.

SNC requests NRC staff approval of the license amendment by January 16, 2018, to support closure of affected ITAAC. Delayed approval of this license amendment could result in a delay in timely closure of the ITAAC. SNC expects to implement this proposed amendment within 30 days of approval of the requested changes. South Carolina Electric & Gas Company (SCE&G) has stated that the current requested approval date for the expected parallel LAR for Virgil C. Summer Nuclear Station (VCSNS) Units 2 & 3 is May 4, 2018.

In accordance with 10 CFR 50.91, SNC is notifying the State of Georgia by transmitting a copy of this letter and its enclosures to the designated State Official.

Should you have any questions, please contact Ryan Henderson at (205) 992-6426.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 14th of July 2017.

Respectfully submitted,

Brian H. Whitley
Director, Regulatory Affairs
Southern Nuclear Operating Company

Enclosures
1) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Request for License Amendment Regarding Changes to Containment Cooling and Spent Fuel Pool Makeup Strategies (LAR-17-021)
2) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Exemption Request: Changes to Containment Cooling and Spent Fuel Pool Makeup Strategies (LAR-17-021)
3) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Proposed Changes to Licensing Basis Documents (LAR-17-021)
4) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Conforming Technical Specification Bases Changes (LAR-17-021) (For Information Only)

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Southern Nuclear Operating Company

ND-17-1145

Enclosure 1

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Request for License Amendment Regarding

Changes to Containment Cooling and Spent Fuel Pool Makeup Strategies

(LAR-17-021)

(This Enclosure consists of 29 pages, including this cover page)

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Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC) hereby requests an amendment to Combined License (COL) Nos. NPF-91 and NPF-92 for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, respectively.

1. SUMMARY DESCRIPTION

The requested amendment proposes the following changes:

1. Revising COL Appendix A Technical Specification (TS) 3.6.6, "Passive Containment Cooling System (PCS)," to change the reactor decay heat limit identifying when air-only passive containment cooling system (PCS) capability is sufficient to provide the required reactor decay heat removal with the reactor in MODES 5 and 6, and reflecting this change in TS Tables 3.3.9-1 and 3.3.19-1,

2. Revising TS 3.7.9, "Spent Fuel Pool Makeup Water Sources," to change the NOTES to require OPERABILITY of the fuel transfer canal, change the APPLICABILITY to "When irradiated fuel assemblies are stored in the spent fuel pool," change the spent fuel pool (SFP) decay heat levels for which the specified contingent of safety-related SFP makeup water sources are required to be operable, and add new SR 3.7.9.5 to verify the fuel transfer canal is in communication with the spent fuel pool,

3. Changing the minimum required SFP, fuel transfer canal (FTC), and cask washdown pit (CWP) water storage volumes in COL Appendix C Table 2.3.7-4, Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) item Nos. 2.3.07.07b.i and 2.3.07.07b.ii (and plant-specific Tier 1 Table 2.3.7-4, ITAAC items 7b.i and 7b.ii). The proposed changes to these ITAAC also redefine the measurement locations for the required SFP and SFP makeup water volumes, and

4. Adding a new ITAAC item 7b.vii in COL Appendix C Table 2.3.7-4 (and plant-specific Tier 1 Table 2.3.7-4) to define the minimum volume of water in the cask loading pit (CLP) required as a safety-related SFP makeup water source and define the CLP volume measurement locations.

Corresponding changes are proposed to related Updated Final Safety Analysis Report (UFSAR) sections as detailed below.

2. DETAILED DESCRIPTION

2.1 Air-Only Passive Containment Cooling System Reactor Decay Heat Limit

As discussed in UFSAR subsection 6.2.2, the PCS functions to reduce the containment temperature and pressure following a loss of coolant accident (LOCA) or main steam line break (MSLB) accident inside the containment (i.e., containment design basis events) by removing thermal energy from the containment atmosphere. By reducing the containment pressure post-accident, the PCS also limits the release of radioactivity following an accident. As identified in UFSAR subsection 6.2.2.1, one of the design basis features of the PCS is to be capable of removing sufficient thermal energy from the containment atmosphere following a containment design basis event resulting in containment pressurization such that the containment pressure remains below the containment pressure design value of 59 psig with no operator action required for the first 72 hours following the event. The PCS, via the passive containment

cooling water storage tank (PCCWST), also provides a source of safety-related makeup water to the spent fuel pool in the event of a prolonged loss of normal spent fuel pool cooling.

As described in UFSAR subsection 6.2.2.2.4, "System Operation," PCS is automatically initiated upon the receipt of two out of four containment high pressure signals via the protection and safety monitoring system (PMS), or from a containment high temperature signal via the diverse actuation system (DAS). These signals result in opening of the PCCWST isolation valves, allowing water from the PCCWST to flow over the steel containment shell. The PCCWST is a safety-related, seismic Category I tank that provides a sufficient inventory of water to provide cooling of containment for the first 72 hours following a containment design basis event. At 72 hours following the containment design basis event, operators take action to align the passive containment cooling ancillary water storage tank (PCCAWST) to the suction of the PCS recirculation pumps to replenish supply to the PCCWST. Sufficient inventory is available in the PCCAWST to maintain the minimum required flowrate to the containment shell for an additional four days. Additionally, a safety-related seismic flowpath can be used to supply an alternate water supply directly to the PCS distribution bucket that conveys the water flow to the containment shell, or to the PCCWST to replenish its inventory.

As identified in TS 3.6.6, the PCS is required to be OPERABLE in MODES 1, 2, 3, and 4, and in MODES 5 and 6 with the reactor decay heat > 6.0 MWt. As explained in the Bases for TS 3.6.6, in MODES 5 and 6, with the reactor decay heat at or below 6.0 MWt, PCS is not required to be OPERABLE since the reactor decay heat can be removed from containment with air cooling alone (air-only PCS cooling). Air cooling alone can provide sufficient cooling of the containment for the first 72 hours following a loss of normal shutdown cooling provided by the residual heat removal system (RNS). Following the initial 72-hour period following an abnormal event, nonsafety-related cooling water sources are available to supply cooling water to the PCS for containment cooling.

This license amendment request proposes to change the reactor decay heat limit specified in TS 3.6.6, for which air-only PCS cooling is sufficient, from 6.0 MWt to 7.0 MWt. This change is supported by a revision of the applicable containment cooling analysis that reevaluated when air-only PCS cooling was credited. The previous analyses supporting the existing 6.0 MWt limit assumed air-only PCS cooling for the entire 7 day period following a loss of normal shutdown cooling, instead of only the initial 72 hours following a loss of normal shutdown cooling. The revised analysis assumed air-only PCS cooling for the first 72 hours following a loss of normal shutdown cooling, followed by cooling water supplied via the PCCAWST for the remainder of the 7-day period following a loss of normal shutdown cooling. The 72 hour time period is specified as the safety-related mission time of the PCS; thereafter, nonsafety-related equipment is used, consistent with the current licensing basis.

The reason for this change, as discussed further below, is to enable the PCCWST to be available to support SFP cooling as required in TS 3.7.9 earlier in a refueling outage, and consequently, enhance refueling outage efficiency. With this change, PCS can be available to support SFP cooling in the event of a seismic event concurrent with a station blackout when the reactor has a higher level of reactor decay heat (7.0 MWt vs. 6.0 MWt). Corresponding changes (revising the air-only PCS cooling reactor decay heat limit of 6.0 MWt to 7.0 MWt) are proposed to TS Table 3.3.9-1, footnote (f), which identifies the reactor decay heat limit for which manual initiation of PCS is required to be OPERABLE, and to TS Table 3.3.19-1, footnote (b), which identifies the reactor decay heat limit for which DAS manual control of the PCCWST

isolation valves must be OPERABLE. Corresponding changes are also proposed to several additional subsections in the UFSAR, as detailed in "Licensing Basis Changes," below.

2.2 Spent Fuel Pool Cooling Safety-Related Makeup Water Sources

The normal SFP cooling design function is provided by the safety-related seismic Category I SFP and FTC, and the non-safety related spent fuel pool cooling system (SFS). As discussed in UFSAR subsection 5.4.7, in the event the SFS is unavailable, the spent fuel pool is capable of being cooled by the nonsafety-related RNS when it is not needed for shutdown cooling. As identified in UFSAR subsection 9.1.3.4.3, during the first 72 hours following an extended loss of SFS, and with the RNS unavailable to support SFP cooling, SFP cooling is provided by the water inventory contained in the SFP, and the safety-related SFP makeup water sources. The SFP safety-related makeup water sources include the seismic Category I FTC, the seismic Category I CWP, the seismic Category I CLP, and the seismic Category I PCCWST. Figure 1 below provides a schematic diagram of the SFP and the SFP safety-related makeup water sources, and identifies the boundaries of the volumes of the safety-related SFP makeup water sources defined in ITAAC, and discussed further below.

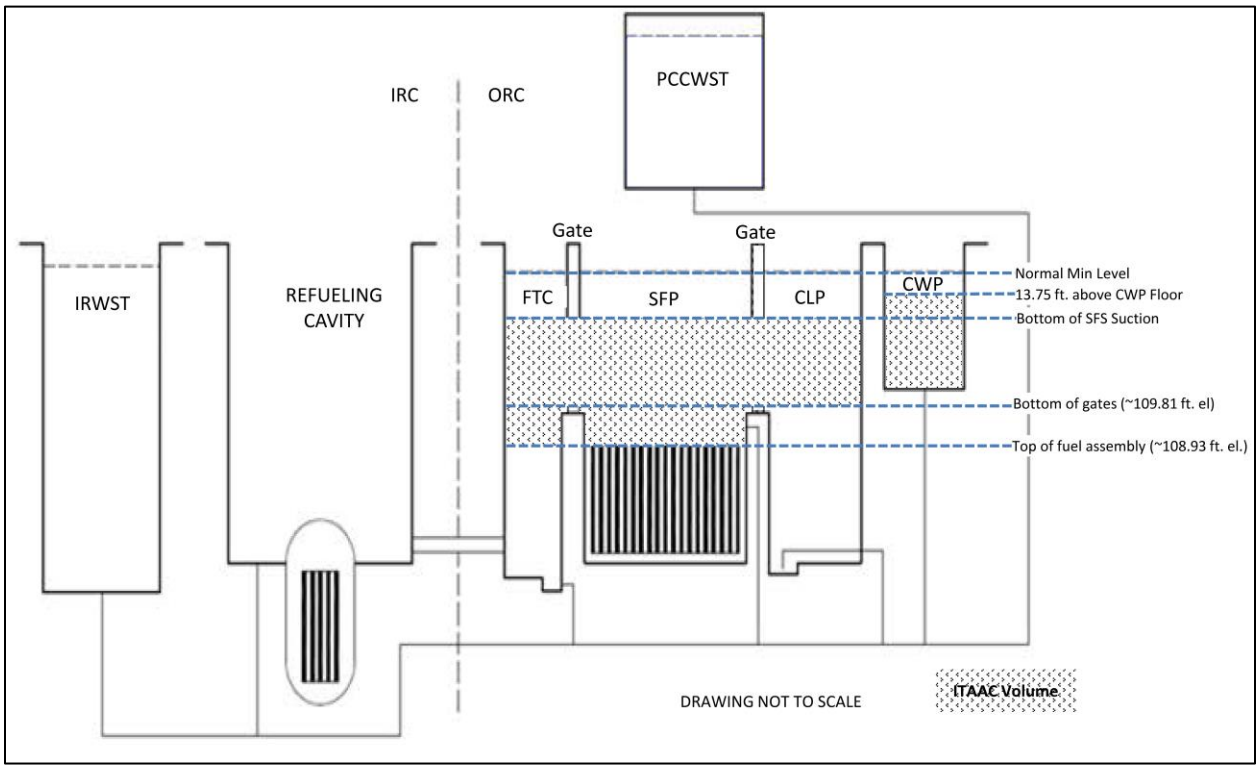

Figure 1 – Spent Fuel Pool & SFP Safety-Related Makeup Sources

As described in UFSAR subsection 9.1.3.4.3, after the initial 72 hours following an extended loss of SFP cooling, SFP makeup water can be supplied via the PCCAWST, or alternatively, as described in UFSAR subsection 9.1.3.4.3.4, via a safety-related, seismically qualified flowpath and makeup connection.

As identified in UFSAR Table 9.1-4, Note 2 and Note 8, the design basis event for SFP cooling assumes a seismic event concurrent with a station blackout event. The SFS suction line to the spent fuel pool is assumed to fail, and the water in the SFP, FTC, CLP, and CWP are assumed to drain to the bottom elevation of the SFS suction piping attachment to the SFP, located approximately 21 feet above the top of active fuel stored in the SFP. The contingent of safety-related SFP cooling required by TS 3.7.5, and SFP makeup sources required by TS 3.7.9 to support SFP cooling, is a function of the decay heat of the spent fuel stored in the pool. TS 3.7.9 identifies the ranges of SFP decay heat values for which the specified safety-related makeup water sources must be available, while the SFP and FTC must be available anytime irradiated fuel is stored in the SFP.

This amendment request, in part, proposes to redefine the TS 3.7.9 SFP decay heat limits identifying the conditions when the safety-related SFP makeup sources must be available, based on a revised SFP heatup and boiloff analysis. The proposed redefinition of these limits is to account for an additional loss of SFP water following the postulated design basis event, as a result of conditions not previously considered in the SFP heatup and boiloff analyses. Specifically, following the SFP cooling design basis event and subsequent draindown of the SFP and safety-related makeup sources to the bottom of the SFS suction piping attachment to the SFP, the subsequent heatup of the SFP water would result in a pool swell due to thermal expansion and the formation of steam bubble voids as the pool begins to boil. This pool swell would result in an additional loss of water inventory through the SFS suction piping attachment to the SFP subsequent to the initial draindown of the SFP and safety-related makeup sources following the SFP design basis event. Accordingly, the SFP heatup and boiloff analysis was revised to account for the additional loss of SFP safety-related makeup water resulting in revised decay heat limits for the supporting makeup volumes.

TS 3.6.6 identifies the reactor decay heat limit above which the PCCWST must be exclusively available for containment cooling, which is also reiterated in TS 3.7.9. This is the air-only PCS cooling reactor decay heat limit specified in TS 3.6.6 for MODES 5 or 6 discussed above in Section 2.1. Above the TS 3.6.6 limit, the PCCWST must be available exclusively for containment cooling, and thus cannot be credited to support SFP cooling. This restriction exists because the PCS is not designed to provide cooling water to the containment shell and makeup to the SFP simultaneously during the first 72 hours. Accordingly, TS 3.7.9 is revised to reflect the proposed change in reactor decay heat for which air-only PCS cooling can provide sufficient cooling for the first 72 hours, as discussed in Section 2.1 above.

The proposed changes to TS 3.7.9 include:

1. Changing the NOTES to require OPERABILITY of the fuel transfer canal,

2. Changing the APPLICABILITY to “When irradiated fuel assemblies are stored in the spent fuel pool,”

3. Adjusting the SFP decay heat ranges for which the CWP, the CLP, and the PCCWST must be available to support the SFP cooling function,

4. Adjusting the reactor decay heat limit for which the PCCWST must be exclusively available for containment cooling in accordance with the proposed changes to COL Appendix A, TS 3.6.6, “Passive Containment Cooling System (PCS),” and

5. Adding new SR 3.7.9.5 to verify the fuel transfer canal is in communication with the spent fuel pool.

Specifically, the proposed changes to TS 3.7.9 are as shown in Table 1 below.

Table 1
Proposed Changes to Technical Specification 3.7.9

SFP Safety-Related Makeup Water Sources Required	Proposed Changes	
CWP Required	Current	4.7 MWt < SFP decay heat ≤ 7.2 MWt
	Proposed	4.0 MWt < SFP decay heat ≤ 7.0 MWt
CLP Required	Current	5.6 MWt < SFP decay heat ≤ 7.2 MWt
	Proposed	5.0 MWt < SFP decay heat ≤ 7.0 MWt
PCCWST Required	Current	SFP decay heat > 7.2 MWt
	Proposed	SFP decay heat > 7.0 MWt
Applicability	Current	SFP decay heat > 4.7 MWt
	Proposed	When irradiated fuel assemblies are stored in the spent fuel pool.
Reactor Decay Heat That PCCWST Required to be Exclusively Available for Containment Cooling	Current	Reactor decay heat > 6.0 MWt
	Proposed	Reactor decay heat > 7.0 MWt

As identified in Table 1 above, TS 3.7.9 currently requires that the PCCWST be available for SFP cooling if the SFP decay heat is > 7.2 MWt (proposed to be reduced to 7.0 MWt). Given these requirements, during a refueling, the spent fuel assemblies cannot be offloaded from the core such that the SFP decay heat would be > 7.2 MWt (> 7.0 MWt as proposed) until the reactor decay heat is at or below the air-only PCS cooling reactor decay heat limit (≤ 6.0 MWt; ≤ 7.0 MWt as proposed). This restriction is because the PCCWST cannot supply water to both the containment and SFP concurrently for the first 72 hours. These TS requirements are provided to assure that at least 72 hours of passive cooling from safety-related sources is available for both the SFP and the containment in the event of a seismic event concurrent with a station blackout.

Additionally, TS 3.7.9 is revised to add new surveillance requirement (SR) 3.7.9.5, which requires confirmation that the FTC is in communication with the SFP (i.e., the FTC gate is open). This is required since the FTC water volume is credited in the SFP heatup and boiloff analysis as a safety-related SFP makeup water source. SR 3.7.9.5 verifies that the fuel transfer canal water volume is available and connected to the spent fuel pool such that no action is required in the fuel handling area in the event of a loss of spent fuel cooling. Additionally, when the FTC is in communication with the SFP, there is confirmation that the FTC contains sufficient

volume to support the assumptions in the SFP heatup and boiloff analysis, since the FTC level will coincide with the SFP water level, which is controlled by TS 3.7.5.

ITAAC Changes

Changes are also proposed to Tier 1 Table 2.3.7-4 as follows:

- ITAAC Item 7b.i) is changed to 1) revise the definition of the required volume, 2) revise the value of the required volume, and 3) revise the specified reference elevations of the required volume,
- ITAAC Item 7b.ii) is changed to 1) revise the value of the required volume, and 2) specify the reference elevations of the required volume, and
- New ITAAC Item 7b.vii) is added to 1) identify the value of the required CLP volume, and 2) specify the reference elevations of the required volume.

The changes to these volumes are as identified in Table 2 below.

Table 2
Tier 1 Table 2.3.7-4 ITAAC Item 7.b) Changes

ITAAC	Volume	ITAAC Changes
Item 7b.i)	SFP & FTC	Revised as follows: The volume of the spent fuel pool, ~~and~~ fuel transfer canal, and both gate areas above the fuel assemblies and ~~to the elevation 6 feet~~ below the spent fuel pool cooling suction piping ~~operating deck~~ is greater than or equal to 130,350 ~~129,500~~ gallons.
Item 7b.ii)	CWP	Revised as follows: The water volume of the cask washdown pit from the cask washdown pit floor to 13.75 feet above the cask washdown pit floor is greater than or equal to 34,100 ~~30,900~~ gallons.
Item 7b.vii) (new)	CLP	New ITAAC as follows: Inspections, Tests, and Analyses vii) Inspection will be performed to verify the cask loading pit includes a sufficient volume of water. Acceptance Criteria vii) The water volume of the cask loading pit above the bottom of the gate and below the spent fuel pool cooling suction piping is greater than or equal to 46,050 gallons.

The proposed ITAAC changes are due to a re-evaluation of the SFP, FTC, CWP, and CLP volumes in the revised SFP heatup and boiloff analysis, the addition of the volumes in the gate areas between the SFP and the FTC and between the SFP and the CLP, consideration of construction tolerances, and revision of the reference locations for the specified volume. An illustration of the ITAAC volumes that comprise the SFP safety-related makeup sources is

shown in Figure 1 above. Note that as discussed above, the PCCWST volume is not credited for SFP makeup if the reactor decay heat is > 7.0 MWt. Corresponding changes are proposed to UFSAR Table 9.1-2.

2.3 Spent Fuel Pool & Primary Containment Cooling – Post 72 Hours Through 7 Days

As discussed above, following a loss of SFP cooling with RNS unavailable, makeup to the SFP is supplied by safety-related sources. As discussed in UFSAR subsection 9.1.3.4.3, following the initial 72 hours following the design basis seismic event concurrent with a station blackout, SFP makeup water can be supplied via the PCCAWST. As described in UFSAR subsection 6.2.2.4.2, the PCS recirculation pumps must be capable of providing cooling water from the PCCAWST simultaneously to the PCCWST and to the SFP to support both containment and SFP cooling for the 4 day period following the initial 72 hours following the SFP cooling design basis event. Alternatively, as described in UFSAR subsection 9.1.3.4.3.4, cooling water can be provided via a safety-related, seismically qualified flowpath and makeup connection. Tests to assure the flow requirements can be met for concurrently providing flow from the PCCAWST to the PCCWST and the SFP are identified in UFSAR subsection 6.2.2.4.2. These concurrent flow tests reflect various reactor decay heat and spent fuel decay heat points during the post-72 hour period requiring PCCAWST concurrent flows. The heat load ranges associated with these flow tests are identified in Table 4 below. These flow tests are modified to identify a new post-72 hour flow case to address additional spent fuel pool and reactor decay heat scenarios.

The proposed changes to these post-72 hour PCCAWST flow tests are as shown in Table 3 below.

Table 3
UFSAR Post-72 Hour PCCAWST Containment & Spent Fuel Pool Flow Requirements

Current UFSAR		Revised UFSAR		Reason for New Flow Tests
Flow to PCCWST	**Flow to SFP**	**Flow to PCCWST**	**Flow to SFP**	Added new flow distribution test to bound new scenario 4 identified in Table 4 below, which includes consideration of SFP decay heat ≥ 7.0 MWt and a reactor decay heat ≤ 7.0 MWt with air-only cooling assumed for the PCS for the first 72 hours, followed by a flow of 50 gpm from the PCCAWST to the PCCWST at 72 hours into the event.
100 gpm	35 gpm	100 gpm	35 gpm	
80 gpm	50 gpm	80 gpm	50 gpm	
N/A	N/A	50 gpm	80 gpm	

Section 3.3 below discusses the reactor and SFP decay heat scenarios which provide the basis for the new post-72 hour PCCAWST concurrent flow tests. Corresponding changes are made to UFSAR Table 6.2.2-1 to remove the previous PCCAWST concurrent flow information in Note 7, since the information was redundant to information contained in UFSAR subsection 6.2.2.4.2.

The revised analysis also results in changes to UFSAR Table 9.1-4. The Note (5) reference on the value in the last column of the second event (height of water above fuel at 7 days) is

changed to a Note (6) reference, as the PCCAWST, and not the PCCWST is credited in this scenario following 72 hours through 7 days.

Additionally, Note (6), which identifies alignment of the PCCAWST to the SFP for makeup, is deleted from the first line (Seismic Event – Power Operation Immediately Following a Refueling), second column (Height of Water Above Fuel at 72 Hours (feet)). This is deleted because the second column addresses the first 72 hours of the event, during which only safety-related makeup water sources are credited.

Licensing Basis Changes

Licensing Basis Section	**Description of the proposed change**
Tier 1 and corresponding COL Appendix C Table 2.3.7-4, Item 7b.i, 7b.ii; add new Item 7b.vii	Revise the minimum water volume of the spent fuel pool and fuel transfer canal above the fuel from 129,500 gallons to 130,350 gallons; clarify that the volume includes both gate areas and is the volume above the fuel assemblies; and identify that the volume measurement extends from "above the fuel assemblies" to "below the spent fuel pool cooling suction piping" instead of "above the fuel" and "to the elevation 6 feet below the operating deck." Revise the minimum water volume of the cask washdown pit from 30,900 gallons to 34,100 gallons and clarify that the measurement is taken from the CWP floor to 13.75 feet above the CWP floor (the level required by the Technical Specifications). Add a new requirement to verify that the minimum water volume of the cask loading pit above the bottom of the gate and below the spent fuel pool cooling suction piping is greater than or equal to 46,050 gallons.
TS Table 3.3.9-1, "Engineered Safeguards Actuation System Instrumentation"	Revise Note (f) from 6.0 MWt to 7.0 MWt.
TS Table 3.3.19-1, "DAS Manual Controls"	Revise Note (b) from 6.0 MWt to 7.0 MWt.
TS 3.6.6, "Passive Containment Cooling System (PCS)"	Revise Applicability for Modes 5 and 6 from 6.0 MWt to 7.0 MWt

TS 3.7.9, "Spent Fuel Pool Makeup Water Sources"	Revise LCO 3.7.9 Notes as follows: • Revise the decay heat applicability transitions for cask washdown pit from "> 4.7 MWt and ≤ 7.2 MWt" to "> 4.0 MWt and ≤ 7.0 MWt" • Revise the decay heat applicability transitions for cask loading pit from "> 5.6 MWt and ≤ 7.2 MWt" to "> 5.0 MWt and ≤ 7.0 MWt" • Revise the requirement of OPERABILITY of the PCCWST for the SFP from a spent fuel pool decay heat of ">7.2 MWt" to ">7.0 MWt" and OPERABILITY of the PCCWST exclusively for containment cooling from a reactor decay heat of "> 6.0 MWt" to "> 7.0 MWt". • Add new Note 4 identifying that OPERABILITY of the FTC is required. Revise Applicability to require applicability whenever irradiated fuel assemblies are stored in the SFP. Revise SR 3.7.9.1, 3.7.9.2, and 3.7.9.3 applicability from "> 7.2 MWt" to "> 7.0 MWt." Revise SR 3.7.9.4 applicability from "> 5.6 MWt and ≤ 7.2 MWt" to from "> 5.0 MWt and ≤ 7.0 MWt" Add new SR 3.7.9.5 to verify every 31 days that the FTC is in communication with the SFP, and renumber existing SR 3.7.9.5 to SR 3.7.9.6.
UFSAR Subsection 6.2.2.4.2, "Preoperational Testing"	Revise to identify the new requirement that the PCS recirculation pumps must be capable of providing flow from the PCCAWST to the PCCWST and the SFP; a concurrent flow requirement of greater than or equal to 50 gpm to the PCCWST and greater than or equal to 80 gpm to the SFP; and simplify the presentation of the information as follows: • Greater than or equal to 100 gpm to the PCCWST and greater than or equal to 35 gpm to the SFP. • Greater than or equal to 80 gpm to the PCCWST and greater than or equal to 50 gpm to the SFP. • Greater than or equal to 50 gpm to the PCCWST and greater than or equal to 80 gpm to the SFP. Revise to delete the reference to the installation of temporary instrumentation or changes to the PCCWST tank level to verify these flowrates.

UFSAR Table 6.2.2-1, "Passive Containment Cooling System Performance Parameters"	Remove the minimum makeup flow rates from Note 7, clarify that the minimum makeup flow rates are adjusted as necessary following a design basis loss of normal spent fuel pool cooling event that occurs during a refueling, and provide a reference to UFSAR subsection 6.2.2.4.2.
UFSAR Subsection 9.1.3.4.3, "Abnormal Conditions"	Clarify in the first paragraph that when SFS is unavailable, SFP cooling is provided by the heat capacity of the water in the SFP and its connected safety-related spent fuel pool makeup water sources for the first 72 hours following a loss of normal spent fuel pool cooling, and identify the connected SFP safety-related makeup water sources. Revise the decay heat values consistent with the TS, changing "4.7 MWt" to "4.0 MWt", "5.6 MWt" to "5.0 MWt", "6.0 MW" to "7.0 MWt" throughout section: • Bullet 1: "4.7 MWt" to "4.0 MWt" • Bullet 2: "4.7 MWt" to "4.0 MWt" and "5.6 MWt" to "5.0 MWt" • Bullet 3: "5.6 MWt" to "5.0 MWt" and "7.2 MWt" to "7.0 MWt" • Bullet 4: "7.2 MWt" to "7.0 MWt" • Bullet 5: "at or below 6.0 MW" to "less than or equal to 7.0 MWt" • Bullet 6: "6 MWt" to "7.0 MWt" Additionally, revise bullets 1, 2, and 3 to identify that safety-related makeup from the FTC is required for the specified conditions. After the 4th paragraph, identify that alignment of the FTC is accomplished by opening the gate. In the 5th paragraph revise to identify that the cask loading pit gate should be opened prior to exceeding 5.0 MWt. In the 10th paragraph, revise as follows: • Clarify that the flow rates from the PCCAWST to the SFP by the PCS recirculation pumps are dependent upon plant condition, and specified to keep the fuel covered as SFP water boils off, • Clarify that the 35 gpm flow rate from the PCCAWST to the SFP is required when the SFP decay heat is ≤ 5.0 MWt, • Clarify that the 50 gpm flow rate from the PCCAWST to the SFP is required when the SFP decay heat is > 5.0 MWt and ≤ 7.0 MWt, • Identify that the 80 gpm flow rate from the PCCAWST to the SFP is required when the SFP decay heat is > 7.0 MWt.

UFSAR Subsection 9.1.3.6.1.3, "Dimensional Inspections"	Revise to add the CLP as one of the volumes credited for SFP cooling after a prolonged loss of normal SFP cooling.
UFSAR Table 9.1-2, "Spent Fuel Pool Cooling and Purification System Design Parameters"	Clarify that the FTC design volume of 63,500 gallons includes the gate "area," at a water level of 15 inches below the operating deck. Revise the minimum water volume of the spent fuel pool and fuel transfer canal above the fuel from 129,500 gallons to 130,350 gallons, and clarify that the volume includes both gate areas, and that it is above the fuel assemblies and below the spent fuel pool cooling suction piping. Revise the minimum water volume of the cask washdown pit from 30,900 gallons to 34,100 gallons, and define the CWP volume as from the CWP floor to 13.75 feet above the CWP floor. Add a new entry identifying the volume of the cask loading pit of 46,050 gallons, and define the CLP volume as from the bottom of the CLP gate to the bottom of the spent fuel pool cooling suction piping.
UFSAR Table 9.1-4, "Station Blackout/Seismic Event Times"	For the first event, "Seismic Event – Power Operation Immediately Following a Refueling," revise the "Time to Saturation" from 7.38 hours to 6.0 hours; the "Height of Water Above Fuel at 72 Hours," from 1.4 feet to 0.5 feet, and the "Height of Water Above Fuel at 7 Days," from 1.4 feet to 0.5 feet. Delete reference to Note 6 for the value of 0.5 for "Height of Water Above Fuel at 72 Hours." For the second event, "Seismic Event – Refueling, Immediately Following Spent Fuel Region Offload," revise the "Time to Saturation" from 5.59 hours to 4.5 hours; the "Height of Water Above Fuel at 72 Hours," from 4.2 feet to 1.0 feet, and the "Height of Water Above Fuel at 7 Days," from 4.2 feet to 1.0 feet. Change the Note reference on the value for "Height of Water Above Fuel at 7 Days" from Note "5" to Note "6." For the third event, "Seismic Event – Refueling, Emergency Full Core Off-Load Immediately Following Refueling," revise the "Time to Saturation" from 2.33 hours to 2.0 hours. Revise Note 2 and 8 to identify that the water volumes in both gate areas are credited for the postulated events. Revise Note 5 to identify that the reactor decay heat is "7.0 MWt" and that no PCS water is required for 72 hours. Revise Note 7 to identify that the worst case scenario is an 18-month fuel cycle plus 5 defective fuel assemblies, and delete the 24 month fuel cycle information.

Corresponding changes are shown to the Technical Specification Bases in Enclosure 4 for information only.

3. TECHNICAL EVALUATION

3.1 Air-Only Passive Containment Cooling System Reactor Decay Heat Limit

As discussed above, this amendment request proposes revising the "air-only" PCS cooling reactor decay heat limit in TS 3.6.6 and TS 3.7.9 (to increase the reactor decay heat limit for which the PCCWST is not required to support containment cooling during the first 72 hours following a containment design basis event) from 6.0 MWt to 7.0 MWt. This change results from reevaluating when air-only containment cooling was assumed in the analysis.

As discussed in Section 2.1 above, the PCS is designed to cool containment following a containment design basis event (LOCA or MSLB accident), assumed to occur at full reactor power. Following a containment design basis event, water contained in the PCCWST flows to a distribution bucket where it is distributed over the containment shell. Air entering through inlets located at the top of the shield building flows down through the annulus along the outside of an air baffle that separates the incoming airflow with the exiting airflow. At the bottom of the annulus, the airflow is directed upward via natural convection between the air baffle and the containment shell, to a vent located at the top of the shield building that exhausts to the atmosphere. The combination of water from the PCCWST flowing down along the containment structure and the airflow flowing upward along the containment shell provide the necessary cooling of the containment following a LOCA or MSLB accident to maintain containment pressure below its design basis limit of 59 psig. When the reactor is shut down and in MODES 5 or 6, the primary and secondary systems are at lower energy levels. At a certain reactor decay heat limit and with the reactor in MODES 5 or 6, the PCS is capable of providing sufficient cooling to the containment for abnormal events such as loss of shutdown cooling with just natural air circulation (i.e., without water from the PCCWST flowing over the containment shell). Based on analyses performed for this mode of PCS cooling ("air-only" cooling), a reactor decay heat limit is determined such that at or below the reactor decay heat limit, air-only PCS cooling will provide sufficient cooling to maintain containment below its 59 psig limit for the first 72 hours following the event. At 72 hours, water from the PCCAWST is used to replenish the PCCWST, or to provide flow directly to the PCS water distribution bucket, to support cooling for the balance of the 7 days following the abnormal event. This limit is currently 6.0 MWt, and is proposed to be revised to 7.0 MWt based on the new evaluation.

The previous air-only PCS containment cooling analysis ran the containment cooling transient with a reactor decay heat of 6.0 MWt with air-only PCS cooling for at least 600,000 seconds (approximately 7 days), which allowed containment pressure to approach equilibrium. A reevaluation was performed with air-only PCS cooling for 72 hours, followed by 50 gpm PCCAWST cooling beginning at 72 hours and continuing for 7 days with an initial reactor decay heat of 7.0 MWt. The credit of non-safety related cooling water sources after the initial 72 hours following an abnormal event is consistent with the AP1000 licensing basis. The evaluation resulted in a peak containment pressure well below the containment design pressure limit of 59 psig. Thus, the proposed change to the air-only PCS cooling reactor decay heat limit in TS 3.6.6 and TS 3.7.9 from ≤ 6.0 MWt to ≤ 7.0 MWt is supported by the evaluation.

3.2 Spent Fuel Pool Cooling Safety-Related Makeup Water Sources

As identified in UFSAR subsection 1.2.1.1.3, the fuel handling and storage facility is designed to prevent inadvertent criticality and to maintain shielding and cooling of spent fuel.

The normal spent fuel cooling design function is provided by a combination of the safety-related, seismic Category I spent fuel pool and the non-safety related SFS. As identified in UFSAR subsection 9.1.3, the SFS is designed to remove decay heat which is generated by stored fuel assemblies from the water in the spent fuel pool. As identified in UFSAR subsection 9.1.3.2, normal makeup capability is provided by the nonsafety-related demineralized water transfer and storage system (DWS). Additional makeup capability and boron addition can be provided via the chemical and volume control system (CVS). However, as identified in UFSAR subsection 9.1.3.4.3, the SFS is not required to mitigate design basis events.

As discussed in UFSAR subsection 9.1.3.4.3, in the event the SFS is unavailable, spent fuel cooling is provided by the heat capacity of the water in the pool. Cooling is provided via the transfer of the spent fuel decay heat to the SFP and safety-related SFP makeup water sources, resulting in heatup and eventually, boiling of the water in the SFP. Adequate cooling is provided by maintaining the spent fuel covered with water.

As identified in UFSAR Table 9.1-4, Note 2 and Note 8, the design basis event for the spent fuel pool cooling design function assumes a seismic event concurrent with a station blackout event. This is the most severe event, since the non-seismic SFS suction piping to the SFP is assumed to rupture, resulting in the loss of SFP, FTC, and CLP water inventory to the bottom elevation of the SFS suction piping attachment to the SFP, concurrent with a loss of normal SFS cooling. Additionally, the station blackout renders normal SFS backup cooling and makeup systems unavailable.

During the first 72 hours following the SFP cooling design basis event, spent fuel pool makeup water is required to be supplied by safety-related sources. These safety-related SFP makeup water sources include the water contained in the FTC, the CWP, and the CLP. Additionally, as discussed in UFSAR subsection 9.1.3.4.3, and specified in Technical Specification 3.6.6 and discussed in its associated bases, if the reactor decay heat is ≤ 7.0 MWt (the proposed revised air-only PCS containment cooling reactor decay heat limit), the PCCWST is not needed for containment cooling, and thus is available as another source of safety-related SFP makeup water. If SFP makeup water is required beyond 72 hours following the SFP cooling design basis event, through 7 days, makeup water is provided via the nonsafety-related passive containment cooling ancillary water storage tank (PCCAWST).

Supporting analyses show that the safety-related makeup water sources provided in the design provide for fulfillment of the SFP cooling design function for the initial 72 hours following a postulated design basis seismic event concurrent with a station blackout.

<u>Loss of SFP and SFP Safety-Related Makeup Water Due to Pool Swell</u>

As discussed in Section 2.2 above, the proposed changes reduce the SFP decay heat limits specified in TS 3.7.9 for which the safety-related makeup water sources are conservatively specified, to account for an additional loss of SFP water following the postulated design basis event, as a result of conditions not previously considered in the SFP heatup and boiloff analyses. Specifically, following the SFP cooling design basis event and subsequent draindown of the SFP and FTC to the bottom of the SFS suction piping attachment to the SFP, the subsequent heatup of the SFP water would result in a pool swell due to thermal expansion and the formation of steam bubble voids as the pool begins to boil. This pool swell would result in

an additional loss of water inventory through the SFS suction piping attachment to the SFP subsequent to the initial draindown of the SFP following the design basis event.

The worst case pool swell results from the maximum postulated decay heat in the SFP. The limiting case postulates a seismic event and station blackout following a full core offload following resumption of power after a typical refueling that resulted in the offload of 44% of the reactor fuel (69 assemblies) to the SFP. At the time the SFP is occupied by a whole fresh irradiated core, plus the 44% core from the last refueling, plus 15 years of spent fuel. The decay heat curve used bounds both ANSI/ANS 5.1-1994 and ANSI/ANS 5.1-1979 with a 2 sigma deviation. The analysis determined that for this limiting case, the pool swell following the onset of boiling would result in the loss of approximately 5,830 gallons of additional SFP water inventory through the SFS suction piping assumed to fail, requiring additional inventory from safety-related sources to provide makeup during the first 72 hours. Accordingly, the SFP heatup and boiloff analysis was revised to account for the additional loss of water resulting in revised decay heat limits for the supporting makeup volumes. The results of the revised analysis requires lowering the SFP decay heat limits for which the safety-related SFP makeup water sources identified in TS 3.7.9 are required to be OPERABLE.

Flooding impacts from the SFP design basis event were evaluated previously. The additional 5,830 gallons of water from the postulated SFP pool swell does not significantly affect the overall volume of water assumed for that event; thus the results of the flooding analysis of the postulated SFS suction line break are not affected. Similarly, assuming a station blackout occurs without a seismic event, the pool swell could result in some SFP water overflowing onto the operating deck. Since the tops of the gates between the SFP and the CLP and FTC are approximately 9 inches lower than the operating deck (EL 135′ - 3″), and the CLP and FTC have substantial additional volume between their normal levels and the operating deck, much or all of the 5,830 gallons is expected to flow to these volumes, depending upon the rate of SFP rise. In any case, the operating deck in the vicinity of the SFP (Room 12562) has five drains with sufficient capacity to prevent exceeding the flood depth criteria of the area of 3 inches.

Changes to SFP Safety-Related Makeup Source ITAAC Volumes

The changes to the ITAAC volumes described in Table 2 above result in an increase in the required SFP and SFP safety-related makeup water source volumes currently identified in the licensing basis (e.g., the proposed volume of the SFP and FTC now includes the water volume in the gate area connecting the SFP to the FTC, and the water volume in the gate area connecting the SFP to the CLP). As identified in TS 3.7.9, the CLP is currently identified and required as a SFP safety-related makeup source; however, the CLP volume requirement was not previously identified in ITAAC.

The revised SFP heatup and boiloff analysis discussed above continues to be conservative even following consideration of the loss of SFP and SFP safety-related makeup water inventory and supports the associated ITAAC volume changes. The ITAAC volumes were determined by establishing known reference points, while conservatively taking into account construction tolerances (i.e., increasing or reducing the relevant dimension to reduce the available water volume). The upper and lower elevations for each of the ITAAC measurement reference points were selected to be relevant to the spent fuel decay heat removal analysis.

The SFP, FTC, and CLP upper elevation is based on the lower elevation of the spent fuel cooling suction line which is conservatively assumed to break during a seismic event and reduce the volume of available water below the normal spent fuel pool level.

The SFP and FTC lower elevation is specified to be the top of the fuel assemblies (i.e., top of the fuel assemblies without the rod cluster control assemblies). This elevation is conservative with respect to the volume of water necessary to meet the Tier 1 Design Commitment, which is met provided water level remains above the top of active fuel.

The CLP lower elevation is based on the elevation of the gate between the CLP and SFP, which is the lowest elevation that CLP water can flow into the SFP. The CWP upper elevation is specified to be consistent with the existing Technical Specification 3.7.9 requirement. The CWP lower elevation is specified to be the CWP floor since its total contained volume would be available for SFP makeup. Figure 2 below illustrates the ITAAC volumes as proposed vs. the volumes credited in the analysis for boiloff makeup.

The length and width of the different volumes (wall locations) accounted for the construction tolerances specified in the design to establish conservative water volumes. The revised SFP heatup and boiloff analysis applied the construction tolerances specified in the design to establish conservative volumes of SFP makeup water. Accordingly, the volumes used in the revised SFP heatup and boiloff analysis are conservative, and support the ITAAC reflected in this change.

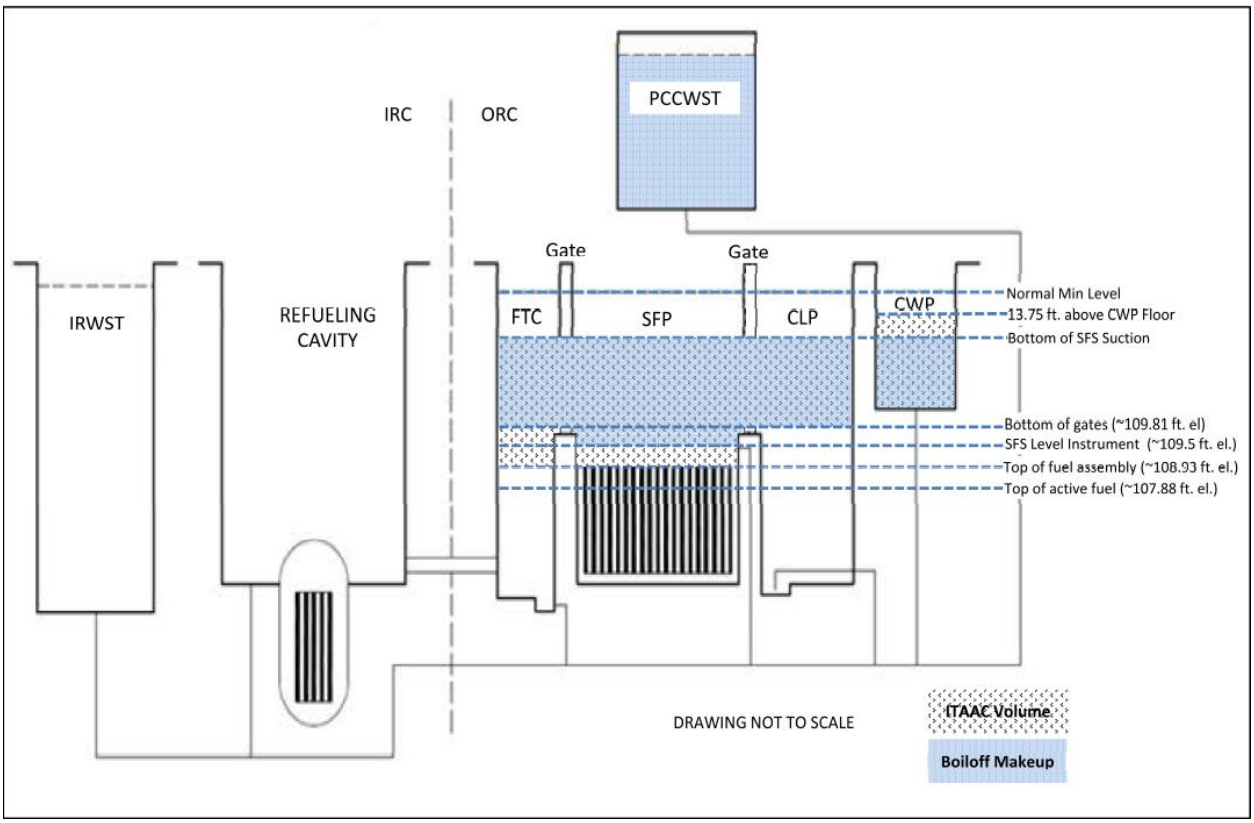

Figure 2 – ITAAC Volumes of Spent Fuel Pool & SFP Safety-Related Makeup Sources

Associated UFSAR Changes

The proposed revisions to UFSAR 9.1.3.4.3:

- Clarify that upon a loss of normal SFP cooling, SFP cooling is provided by the heat capacity of the SFP and its connected safety-related spent fuel pool makeup water sources for the first 72 hours following the loss of normal spent fuel pool cooling,

- Specifically identify the safety-related SFP makeup water sources, including the FTC,

- Identify that alignment of the FTC to the SFP is accomplished by opening the FTC gate,

- Reflect the proposed changes to the SFP decay heat values specified in TS 3.7.9 identifying when each safety-related SFP makeup water source is required to be available, and

- Reflect the proposed change to the containment air-only passive containment cooling system reactor decay heat limit.

The proposed revisions to UFSAR Subsection 9.1.3.6.1.3 add the CLP as one of the volumes credited for SFP cooling after a prolonged loss of normal SFP cooling.

The proposed revisions to UFSAR Table 9.1-2, “Spent Fuel Pool Cooling and Purification System Design Parameters,” reflect the proposed revisions to the ITAAC specifying the required volumes of the safety-related SFP makeup water sources.

The proposed revisions to Table 9.1-4, “Station Blackout/Seismic Event Times:”

- Identify the revised times to saturation, height of the SFP water above the fuel at 72 hours, and height of the water above the fuel at 7 days following the postulated station blackout/seismic event. These revised times reflect the results of the revised SFP heatup and boiloff analysis, rounded down to the nearest half hour,

- Reflect the revision of the air-only passive containment cooling system reactor decay heat limit, and

- Identify that the water volumes in both gate areas are credited for the postulated events.

- Delete the detail related to a 24-month fuel cycle in Note 7 in defining the number of assemblies assumed in defining the SFP decay heat in the SFP analysis.

These revisions to the UFSAR reflect the changes proposed to the Technical Specifications and their supporting analyses, including the changes to the safety-related SFP makeup volumes defined in the proposed ITAAC revisions. The revisions to the values in Table 9.1-4 summarize the revised analysis results that demonstrate that the acceptance criteria for SFP cooling (keeping the fuel covered) continues to be met with the changes as proposed. The discussion of the 24-month fuel cycle in Note 7 is deleted since a 24-month fuel cycle has not been developed for the AP1000.

3.3 Spent Fuel Pool & Primary Containment Cooling – Post 72 Hours Through 7 Days

As discussed in UFSAR subsection 9.1.3.4.3 and discussed above in Section 3.2, in the event of a loss of the normal SFP cooling system, cooling is provided by the heat capacity of the SFP, with any makeup water required supplied from safety-related SFP makeup water sources. If makeup water is required between 72 hours and 7 days following the loss of normal SFP cooling, water from the PCCAWST is provided to the SFP.

As described in UFSAR subsection 6.2.2.2.4, and discussed above in Section 2.1, sufficient water inventory is provided in the PCCWST to provide containment cooling for the first 72 hours following an event that requires PCS operation. At 72 hours following an event requiring operation of the PCS, operators take action to align the PCCAWST to the suction of the PCS recirculation pumps to replenish supply to the PCCWST to support containment cooling from 72 hours following the event through 7 days following the event. Sufficient inventory is available in the PCCAWST to maintain the minimum required flowrate to the containment shell for the additional four days.

Should a plant event, such as the SFP design basis station blackout/seismic event occur which renders both the normal SFP cooling system and the normal shutdown cooling unavailable, water from the PCCAWST may be required, during the 4-day period from 72 hours through 7 days following the event, to supply makeup water to the SFP to maintain sufficient SFP cooling while concurrently providing water to the PCCWST to replenish the PCS water inventory for containment cooling. These concurrent flow requirements are based on the level of decay heat in the reactor and the level of decay heat contained in the spent fuel pool at the time of the postulated event. Since the relative levels of decay heat are a function of when a postulated event occurs (during power operation, during a refueling operation, or immediately following a refueling), the PCCAWST concurrent flow requirements vary accordingly. Table 4 below identifies the PCCAWST concurrent flow requirements for the post-72 hour time period following an event that renders both normal shutdown cooling and the normal SFP cooling system unavailable. Table 4 also identifies the PCCWST availability requirements for containment cooling, the safety-related SFP makeup water source requirements, and for reactor decay heat levels ≤ 7.0 MWt, the PCCWST flow requirements to the SFP for the initial 72 hours following an event that renders both normal shutdown cooling and the normal SFP cooling system unavailable.

Table 4
Revised SFP and PCS Makeup Water Scenarios for First 72 Hours/Post 72 Hours – 7 Days

Reactor Decay Heat (MWt)	Spent Fuel Pool Decay Heat (MWt)	Postulated Scenario	Time Period	Containment Cooling Makeup Water Source Requirement	Spent Fuel Pool Makeup Water Source Requirement
Scenario 1					
> 7.0	≤ 4.0	Full Power Seismic Event Station Blackout	≤ 72 hours	PCCWST .	None Required
			> 72 hours to 7 days	PCCAWST 100 gpm	PCCAWST 35 gpm
Scenario 2					
> 7.0	> 4.0 & ≤ 5.0	SFP is occupied by: 44% core refueling[1] 15 years of spent fuel[2] Full Power Seismic Event Station Blackout	≤ 72 hours	PCCWST	CWP
			> 72 hours to 7 days	PCCAWST 100 gpm	PCCAWST 35 gpm
Scenario 3					
> 7.0	> 5.0 & ≤ 7.0	SFP is occupied by: 15 years of spent fuel Refueling Seismic Event Station Blackout	≤ 72 hours	PCCWST	CWP CLP
			> 72 hours to 7 days	PCCAWST 80 gpm	PCCAWST 50 gpm
Scenario 4					
≤ 7.0	> 7.0	SFP is occupied by: 15 years of spent fuel Refueling Seismic Event Station Blackout	≤ 72 hours	Air Only Cooling	PCCWST 118 gpm
			> 72 hours to 7 days	PCCAWST 50 gpm	PCCAWST 80 gpm

Notes

1. A 44% core refueling refers to the offload of 69 fuel assemblies from the reactor to the SFP.

2. 15 years of spent fuel represents the maximum amount of fuel offloaded over 15 years of operation.

Capability of the PCCAWST to meet the concurrent flow requirements to the SFP and the PCCWST identified in Table 4 above is demonstrated in the preoperational testing presented in the proposed revisions to UFSAR subsection 6.2.2.4.2. The testing demonstrates that sufficient makeup water will be available to the SFP and sufficient cooling water available to replenish the PCCWST for containment cooling for the spectrum of relative decay heat levels possible in the reactor and in the SFP. Evaluation of the PCS system has determined that the PCS recirculation pumps and system are capable of delivering the concurrent flows from the PCCAWST to the PCCWST and SFP as assumed in the analyses, and identified in Table 4 above.

Associated UFSAR Changes

UFSAR subsection 6.2.2.4.2 identifies the concurrent flow tests from the PCCAWST to the SFP and the PCCWST, and confirmation of the capability of the PCS recirculation pumps to deliver the required concurrent flows during preoperational testing. Accordingly, UFSAR subsection 6.2.2.4.2 is updated to add a requirement to confirm the capability of the PCCAWST to deliver concurrent flows of 50 gpm to the PCCWST and 80 gpm to the SFP during the post-72 hour period following an event that renders both the normal shutdown cooling and normal SFP cooling unavailable. This new test is provided to confirm the capability of the PCCAWST to meet the flow requirements associated with new Scenario 4 identified in Table 4 above, which is consistent with the proposed change to raise the containment air-only cooling from 6.0 MWt to 7.0 MWt. The corresponding revision to Note 7 in Table 6.2.2-1 removes information that currently identifies only one PCCAWST concurrent flow requirement and adds a reference to 6.2.2.4.2, which is updated as discussed above.

UFSAR subsection 6.2.2.4.2 is also revised to delete reference to use of temporary instrumentation or changes in the PCCWST level to verify the capability to deliver the required concurrent flows from the PCCAWST to the SFP and the PCCWST during preoperational testing. Permanently installed flow instrumentation on the PCS recirculation pump common discharge line, and on the PCS supply line to the SFP is used to verify the capability to achieve the required concurrent flows.

3.4 Additional Considerations

The proposed changes do not have an impact on the design, configuration, or operation of the nonsafety-related portion or functions of the normal spent fuel pool cooling system. The activity does not alter the fire loads found in any adjacent fire zones or areas as no equipment is added or removed by the activity. The proposed changes do not affect any function or feature used for the prevention and mitigation of accidents or adversely affect their safety analyses. The proposed changes do not involve nor interface with any structure, system or component (SSC) accident initiator or initiating sequence of events related to the accidents evaluated in the plant-specific DCD or UFSAR. The proposed changes do not affect the radiological source terms (i.e., amounts and types of radioactive materials released, their release rates and release durations) used in the accident analyses. Revising the SFP makeup source decay heat levels and revising the ITAAC to align the required volumes of the SFP, FTC, CWP, and CLP with the safety analysis does not result in an impact to the PRA as a result of the proposed changes.

No system or design function or equipment qualification is affected by the proposed changes. The changes do not result in a new failure mode, malfunction or sequence of events that could affect a radioactive material barrier or safety-related equipment. The proposed changes do not allow for a new fission product release path, result in a new fission product barrier failure mode, or create a new sequence of events that would result in significant fuel cladding failures.

The proposed changes associated with this license amendment request do not affect the containment, control, channeling, monitoring, processing or releasing of radioactive and non-radioactive materials. The types and quantities of expected effluents are not changed, and no effluent release path is adversely affected by the proposed changes. Therefore, radioactive or non-radioactive material effluents are not affected by the proposed changes.

Plant radiation zones (as described in UFSAR Section 12.3), controls under 10 CFR 20, and the expected amounts and types of radioactive materials are not affected by the proposed changes. Therefore, individual and cumulative radiation exposures do not change.

3.5 Summary

The requested amendment proposes changes to plant-specific Tier 1 (and COL Appendix C) to revise the inspected volume for the spent fuel pool and cask loading pit, and make corresponding changes to the minimum volumes. A new Tier 1 inspection is also added for the cask washdown pit with appropriate acceptance criteria for its volume. The requested amendment also proposes changes to the Technical Specification reactor decay heat limits and spent fuel pool decay heat limits which reflect when various safety-related makeup paths are required to be available for containment cooling or spent fuel pool makeup. The proposed changes would not affect any safety related equipment or function, a radioactive material barrier or a safety analysis. In addition, no nonsafety related design function or procedure described in the licensing basis would be adversely affected.

4. REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 52.98(f) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a COL. This activity involves a change to COL Appendix C, Inspections, Tests, Analyses and Acceptance Criteria information and corresponding departure from plant-specific Tier 1 information; therefore, this activity requires an amendment to the COL. Accordingly, NRC approval is required prior to making the plant-specific changes in this license amendment request.

10 CFR 52, Appendix D, VIII.C.6 states that after issuance of a license, “Changes to the plant-specific TS will be treated as license amendments under 10 CFR 50.90.” 10 CFR 50.90 addresses the applications for amendments of licenses, construction permits and early site permits. As discussed above, changes to Technical Specifications are requested, and thus a license amendment request (LAR) (as supplied herein) is required.

10 CFR 52, Appendix D, Section VIII.B.5.a allows an applicant or licensee who references this appendix to depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2* information, or the Technical Specifications, or requires a license amendment under paragraphs B.5.b or B.5.c of the section. This change involves a revision to plant-specific Tier 1 information, corresponding COL Appendix C information, and the Technical Specifications, and thus requires NRC approval for the proposed Tier 2 departures and involved Tier 1 information, and Technical Specifications.

10 CFR 50, Appendix A, General Design Criterion (GDC) 16, Containment design, requires that reactor containment and associated systems be provided to establish an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment, and to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require. The proposed changes do not impact the capability of the containment to perform its design function, as the supporting evaluations demonstrate that increasing the air-only PCS limit in TS 3.6.6, "Passive Containment Cooling System (PCS)," and TS 3.7.9, "Spent Fuel Pool Makeup Water Sources," from 6.0 MWt to 7.0 MWt will not result in the containment exceeding its design basis pressure limit during the 72 hours following an event affecting the normal reactor shutdown cooling function, in accordance with the PCS design basis. No changes are proposed to the containment system design criteria. Therefore, the proposed changes do not affect compliance with GDC 16.

10 CFR 50, Appendix A, GDC 38, Containment heat removal, requires that a system to remove heat from the reactor containment shall be provided. The system safety function shall be to reduce rapidly, consistent with the functioning of other associated systems, the containment pressure and temperature following any loss-of-coolant accident and maintain them at acceptably low levels. The proposed changes to TS 3.6.6 and TS 3.7.9 to increase the air-only PCS limit from 6.0 MWt to 7.0 MWt do not impact the results of the limiting containment design basis events, which include a loss of coolant accident (LOCA) or a main steam line break (MSLB) accident inside containment. Additionally, the evaluations performed demonstrate that raising the air-only cooling limit from 6.0 MWt to 7.0 MWt will not result in the containment exceeding its design basis pressure limit during the 72 hours following an event affecting the normal reactor shutdown cooling function, in accordance with the PCS design basis. No changes are proposed to the containment system design criteria. Therefore, the proposed changes do not affect compliance with GDC 38.

10 CFR 50, Appendix A, GDC 40, Testing of containment heat removal system, requires that the containment heat removal system be designed to permit appropriate periodic pressure and functional testing to assure (1) the structural and leak-tight integrity of its components, (2) the operability and performance of the active components of the system, and (3) the operability of the system as a whole, and under conditions as close to the design as practical the performance of the full operational sequence that brings the system into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of the associated cooling water system. The proposed changes: 1) do not alter or affect the function, design, or method of control of the PCS, 2) do not remove or alter any of the existing PCS Technical Specification surveillance requirements or required frequencies, 3) do not result in a revision to PCS In-service Testing (IST) or In-service Inspection (ISI) requirements or frequencies, 4) do not remove or alter any Technical Specification required Protection and Safety Monitoring System (PMS) instrumentation surveillance or calibration requirements or required frequencies, and 5) do not revise any containment leak rate testing requirement, method, or frequency. Therefore, the proposed changes do not affect compliance with GDC 40.

10 CFR 50, Appendix A, GDC 44, Cooling water, requires that a system to transfer heat from structures, systems, and components important to safety, to an ultimate heat sink

be provided. The system safety function shall be to transfer the combined heat load of these structures, systems, and components under normal operating and accident conditions. The PCS provides the safety-related means of transferring heat from the containment to the ultimate heat sink (the atmosphere) during accident conditions. This change raises the reactor decay heat level specified in TS 3.6.6 and TS 3.7.9 for which air-only cooling is sufficient to remove reactor decay heat from the containment from 6.0 MWt to 7.0 MWt for the initial 72 hours following an abnormal event involving a loss of normal reactor shutdown cooling. This change is supported by evaluations which demonstrate that with the reactor shut down with a decay heat level of 7.0, the PCS is capable of removing sufficient decay heat during the first 72 hours following a loss of normal reactor shutdown cooling using air-only cooling. Following the initial 72 hours, cooling water from nonsafety-related sources is credited to provide containment cooling, in accordance with the AP1000 licensing basis. The evaluations demonstrate that with a reactor decay heat of 7.0 MWt, containment pressure will remain well below its design basis pressure limit. The changes proposed to TS 3.7.9 to reduce the decay heat limits for which the specified safety-related spent fuel pool (SFP) makeup water sources are required to be available, in conjunction with the revisions to the required SFP makeup water source volumes specified in COL Appendix C, and plant-specific Tier 1 Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC), ensure that the SFP and its associated safety-related makeup water sources have sufficient capacity to keep the spent fuel in the SFP covered, and thus adequately cooled. These proposed changes are supported by analysis. No changes are proposed to the nonsafety-related normal reactor shutdown cooling system or the nonsafety-related normal SFP cooling system. Therefore, compliance with GDC 44 is maintained.

10 CFR 50, Appendix A, GDC 46, Testing of cooling water system, requires that the cooling water system be designed to permit appropriate periodic pressure and functional testing to assure (1) the structural and leak-tight integrity of its components, (2) the operability and the performance of the active components of the system, and (3) the operability of the system as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the system into operation for reactor shutdown and for loss-of-coolant accidents, including operation of applicable portions of the protection system and the transfer between normal and emergency power sources. With the revision of the SFP safety-related makeup water source volume values and reference measurement locations, there are no physical changes associated with the proposed changes. Accordingly, the testing provisions provided in the current design are unaffected by the proposed changes. Therefore, the proposed changes do not affect compliance with GDC 46.

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 be designed to assure adequate safety under normal and postulated accident conditions. These systems are required to 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. With the revision of the SFP

safety-related makeup water source volume values and reference measurement locations, there are no physical changes associated with the proposed changes. No change is being made to the required spent fuel water level specified in TS 3.7.5. No changes are proposed to the existing airborne or area radiation monitoring provisions in the fuel handling area. Accordingly, the existing SFP inspection provisions, shielding, skimming and filtering systems, inventory retention features and capabilities, and radiation detection provisions are unaffected by the proposed changes. The normal SFP cooling system is not altered as a result of the proposed changes. The changes proposed will provide for sufficient safety-related makeup water to provide adequate spent fuel cooling during normal and abnormal conditions, including the design basis seismic event concurrent with a Station Blackout. Therefore, the proposed changes do not affect compliance with GDC 61.

10 CFR 50, Appendix A, GDC 63, Monitoring fuel and waste storage, requires that appropriate systems shall be provided in fuel storage and radioactive waste systems and associated handling areas (1) to detect conditions that may result in loss of residual heat removal capability and excessive radiation levels and (2) to initiate appropriate safety actions. With the revision of the SFP safety-related makeup water source volume values and reference measurement locations, there are no physical changes associated with the proposed changes. No changes are being made to the SFP water level instrumentation and alarms or actions required in the Technical Specifications upon detection of low water level in the SFP. No changes are being made to containment temperature and pressure monitoring instrumentation, automatic PCS initiation functions, or required actions in the Technical Specifications. Therefore, these changes do not affect compliance with GDC 63.

4.2 Precedent

No precedent is identified.

4.3 Significant Hazards Consideration

The requested amendment proposes changes to Updated Final Safety Analysis Report (UFSAR) Tier 2 information, which involve changes to Combined License (COL) Appendix C and corresponding changes to the plant-specific Tier 1, and COL Appendix A, Technical Specification (TS) information.

The requested amendment proposes changes to plant-specific Tier 1 (and COL Appendix C) to revise the inspected volume for the spent fuel pool and cask washdown pit, and make corresponding changes to the minimum volumes. A new Tier 1 inspection is also added for the cask loading pit with appropriate acceptance criteria for its volume. The requested amendment also proposes changes to the Technical Specification reactor decay heat limits and spent fuel pool decay heat limits which reflect when various safety-related makeup paths are required to be available for containment cooling or spent fuel pool makeup.

An evaluation to determine whether or not a significant hazards consideration is involved with the proposed amendment was completed by focusing on the three standards set forth in 10 CFR 50.92, “Issuance of amendment,” as discussed below:

4.3.1 Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed changes ensure that sufficient spent fuel cooling is provided based on the revised analyses that properly account for thermal expansion and voiding in the Spent Fuel Pool (SFP). The containment and spent fuel cooling capabilities remain adequate to meet the design bases following a seismic event and station blackout. The proposed changes do not alter an accident initiating component, nor do the proposed changes create any new accident precursors, and thus, the probabilities of the accidents previously evaluated are not affected. The plant response to previously evaluated accidents or external events is not adversely affected. Thus, the proposed changes would not affect any safety-related accident mitigating function. The radioactive material source terms and release paths used in the safety analyses are unchanged, thus the radiological releases in the UFSAR accident analyses are not affected.

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

4.3.2 Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed changes are supported by the revised analyses that demonstrate the ability of the affected systems to perform their design function, and additionally, do not introduce a new failure mechanism into the design. The proposed changes do not involve a new failure mechanism or malfunction, which affects a system, structure, or component (SSC) accident initiator, or interface with any SSC accident initiator or initiating sequence of events considered in the design and licensing bases. There is no adverse effect on radioisotope barriers or the release of radioactive materials. The proposed amendment does not adversely affect any accident, including the possibility of creating a new or different kind of accident from any accident previously evaluated.

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

4.3.3 Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

The proposed changes ensure that sufficient spent fuel cooling is provided based on the revised analyses that properly account for thermal expansion and voiding in the SFP. The containment and spent fuel cooling capabilities remain adequate to meet the design bases following a seismic event and station blackout. The containment and SFP cooling capabilities continue to comply with the existing

UFSAR regulatory requirements and industry standards. The proposed changes would not affect any safety-related design code, function, design analysis, safety analysis input or result, or existing design/safety margin. No safety analysis or design basis acceptance limit or criterion is challenged or exceeded by the requested changes.

Therefore, the proposed amendment does not involve a significant reduction in a margin of safety.

Based on the above, it is concluded that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of “no significant hazards consideration” is justified.

4.4 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission’s regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. The above evaluations demonstrate that the proposed changes can be accommodated without an increase in the probability or consequences of an accident previously evaluated, without creating the possibility of a new or different kind of accident from any accident previously evaluated, and without a significant reduction in a margin of safety. Having arrived at negative declarations with regard to the criteria of 10 CFR 50.92, this assessment determined that the proposed change does not involve a Significant Hazards Consideration.

5. ENVIRONMENTAL CONSIDERATIONS

The requested amendment proposes changes to plant-specific Tier 1 (and COL Appendix C) to revise the inspected volume for the spent fuel pool and cask loading pit, and make corresponding changes to the minimum volumes. A new Tier 1 inspection is also added for the cask washdown pit with appropriate acceptance criteria for its volume. The requested amendment also proposes changes to the Technical Specification reactor decay heat limits and spent fuel pool decay heat limits which reflect when various safety-related makeup paths are required to be available for containment cooling or spent fuel pool makeup.

The proposed changes require changes to Updated Final Safety Analysis Report (UFSAR) Tier 2 information, which involve changes to the plant-specific Tier 1 and corresponding changes to COL Appendix C, and Technical Specification (COL Appendix A) information.

This review has determined that the proposed change requires an amendment to the COL. However, a review of the anticipated construction and operational effects of the requested amendment has determined that the requested amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), in that:

(i) There is no significant hazards consideration.

As documented in Section 4.3, Significant Hazards Consideration, of this license amendment request, an evaluation was completed to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment." The Significant Hazards Consideration determined that (1) the requested amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) the requested amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) the requested amendment does not involve a significant reduction in a margin of safety. Therefore, it is concluded that the requested amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

(ii) There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

The requested amendment proposes changes to plant-specific Tier 1 (and COL Appendix C) to revise the inspected volume for the spent fuel pool and cask loading pit, and make corresponding changes to the minimum volumes. A new Tier 1 inspection is also added for the cask washdown pit with appropriate acceptance criteria for its volume. The requested amendment also proposes changes to the Technical Specification reactor decay heat limits and spent fuel pool decay heat limits which reflect when various safety-related makeup paths are required to be available for containment cooling or spent fuel pool makeup. The proposed changes do not affect any aspect of plant construction or operation that would introduce any change to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents), or affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed changes do not affect any effluent release path or diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation. Therefore, it is concluded that the requested amendment does not involve a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The requested amendment proposes changes to plant-specific Tier 1 (and COL Appendix C) to revise the inspected volume for the spent fuel pool and cask loading pit, and make corresponding changes to the minimum volumes. A new Tier 1 inspection is also added for the cask washdown pit with appropriate acceptance criteria for its volume. The requested amendment also proposes changes to the Technical Specification reactor decay heat limits and spent fuel pool decay heat limits which reflect when various safety-related makeup paths are required to be available for containment cooling or spent fuel pool makeup. Plant radiation zones (addressed in UFSAR Section 12.3) are not affected, and controls under 10 CFR 20 preclude a significant increase in occupational radiation exposure. Therefore, the requested amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

Based on the above review of the requested amendment, it has been determined that anticipated construction and operational effects of the requested amendment do not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the requested amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental impact statement or environmental assessment of the proposed amendment is not required.

6. REFERENCES

None.

Southern Nuclear Operating Company

ND-17-1145

Enclosure 2

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Exemption Request:

Changes to Containment Cooling and Spent Fuel Pool Makeup Strategies

(LAR-17-021)

(This Enclosure consists of 7 pages, including this cover page)

1.0 Purpose

Southern Nuclear Operating Company (the Licensee) requests a permanent exemption from the provisions of 10 CFR 52, Appendix D, *Design Certification Rule for the AP1000 Design,* Section III.B, *Scope and Contents*, to allow a departure from elements of the certification information in Tier 1 of the generic AP1000 Design Control Document (DCD). The regulation, 10 CFR 52, Appendix D, Section III.B, requires an applicant or licensee referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including certified information in DCD Tier 1. The Tier 1 information for which a plant-specific departure and exemption is being requested includes revisions to the inspected volume for the spent fuel pool and cask washdown pit with corresponding changes to the minimum volumes and reference measurement locations, and the addition of an inspection for minimum volume for the cask loading pit.

This request for exemption provides the technical and regulatory basis to demonstrate that 10 CFR 52.63, §52.7, and §50.12 requirements are met and will apply the requirements of 10 CFR 52, Appendix D, Section VIII.A.4 to allow departures from generic Tier 1 information due to proposed changes to Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Table 2.3.7-4 ITAAC Items 7b.i), 7b.ii), including the addition of a new inspection, test, and analysis with accompanying acceptance criteria (Item 7b.vii)), for the inspections of the spent fuel pool, fuel transfer canal, cask loading pit, and cask washdown pit.

2.0 Background

The Licensee is the holder of Combined License Nos. NPF-91 and NPF-92, which authorize construction and operation of two Westinghouse Electric Company AP1000 nuclear plants, named Vogtle Electric Generating Plant (VEGP) Units 3 and 4, respectively.

As described in plant-specific Tier 1 and UFSAR Section 9.1.3, the spent fuel pool cooling system (SFS) provides for decay heat removal from spent fuel by boiling water in the pool in the event that the normal heat removal method is not available. If there is a long-term station blackout, makeup water is supplied to the spent fuel pool from onsite storage tanks.

The spent fuel pool (SFP) safety-related makeup water sources include the seismic Category I fuel transfer canal (FTC), the seismic Category I cask washdown pit (CWP), the seismic Category I cask loading pit (CLP), and the seismic Category I passive containment cooling water storage tank (PCCWST).

As identified in UFSAR Table 9.1-4, Note 2 and Note 8, the design basis event for spent fuel pool cooling assumes a seismic event concurrent with a station blackout event. The SFS suction line to the spent fuel pool is conservatively assumed to fail in a seismic event, and the water in the SFP, FTC, CLP, and CWP is assumed to drain to the bottom elevation of the SFS suction piping attachment to the SFP, located approximately 21 feet above the top of active fuel stored in the SFP.

Plant-specific DCD Tier 1 Table 2.3.7-4 specifies the ITAAC related to the SFS. The inspection and acceptance criteria of Tier 1 Table 2.3.7-4 ITAAC item 7b.i) verifies the provided volume of the SFP and FTC; the inspection and acceptance criteria of Tier 1 Table 2.3.7-4 ITAAC item 7b.ii) verifies the provided volume of the CWP. Changes to both items revise the inspected volume for the spent fuel pool and cask washdown pit with corresponding changes to the minimum volumes and reference measurement locations.

Also, new plant-specific DCD Tier 1 Table 2.3.7-4 ITAAC item 7b.vii) is proposed to verify the necessary volume of the CLP. As a safety-related SFP makeup source, the CLP supports the Design Commitment in conjunction with the SFP, FTC, CWP, and PCCWST, which are the subject of other ITAAC items. The CLP was previously not identified in ITAAC.

3.0 Technical Justification of Acceptability

The volumes of water verified by the existing ITAAC are considered as part of the safety-related makeup. The changes to the acceptance criteria reflect the updates to the SFP boiling and heat-up analysis. These updates included consideration of minimum tolerances per the design in the construction of the volumes and accommodated pool swell which would result from the thermal expansion and voiding attributed to steam bubble formation during boiling. The CLP is considered a safety-related makeup source, so the addition of that ITAAC is appropriate. The new ITAAC is consistent with the format and content of the current SFS ITAAC. The analysis supports the acceptability of the changes.

Detailed technical justification supporting this request for exemption is provided in Section 3 of the associated License Amendment Request in Enclosure 1 of this letter.

4.0 Justification of Exemption

10 CFR Part 52, Appendix D, Section VIII.A.4 and 10 CFR 52.63(b)(1) govern the issuance of exemptions from elements of the certified design information for AP1000 nuclear power plants. Since SNC has identified changes to the Tier 1 information as discussed in Enclosure 1 of the accompanying License Amendment Request, an exemption from the certified design information in Tier 1 is needed.

10 CFR Part 52, Appendix D, and 10 CFR 50.12, §52.7, and §52.63 state that the NRC may grant exemptions from the requirements of the regulations provided six conditions are met: 1) the exemption is authorized by law [§50.12(a)(1)]; 2) the exemption will not present an undue risk to the health and safety of the public [§50.12(a)(1)]; 3) the exemption is consistent with the common defense and security [§50.12(a)(1)]; 4) special circumstances are present [§50.12(a)(2)]; 5) the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption [§52.63(b)(1)]; and 6) the design change will not result in a significant decrease in the level of safety [Part 52, App. D, VIII.A.4].

The requested exemption satisfies the criteria for granting specific exemptions, as described below.

1. **This exemption is authorized by law**

   The NRC has authority under 10 CFR 52.63, §52.7, and §50.12 to grant exemptions from the requirements of NRC regulations. Specifically, 10 CFR 50.12 and §52.7 state that the NRC may grant exemptions from the requirements of 10 CFR Part 52 upon a proper showing. No law exists that would preclude the changes covered by this exemption request. Additionally, granting of the proposed exemption does not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations.

   Accordingly, this requested exemption is "authorized by law," as required by 10 CFR 50.12(a)(1).

2. **This exemption will not present an undue risk to the health and safety of the public**

   The proposed exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow changes to elements of the plant-specific Tier 1 DCD to depart from the AP1000 certified (Tier 1) design information. The plant-specific DCD Tier 1 will continue to reflect the approved licensing basis for VEGP Units 3 and 4, and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the DCD. Therefore, the affected plant-specific DCD Tier 1 ITAAC will continue to serve its required purpose.

   The revisions to the inspections and acceptance criteria of the safety-related SFP makeup sources, do not represent any adverse impact to the design function of the SFP systems, structures and components and will continue to protect the health and safety of the public in the same manner. The revisions to the inspections and acceptance criteria of the safety-related SFP makeup sources do not introduce any new industrial, chemical, or radiological hazards that would represent a public health or safety risk, nor do they modify or remove any design or operational controls or safeguards intended to mitigate any existing on-site hazards. Furthermore, the proposed change would not allow for a new fission product release path, result in a new fission product barrier failure mode, or create a new sequence of events that would result in fuel cladding failures. Accordingly, this change does not present an undue risk from any existing or proposed equipment or systems.

   Therefore, the requested exemption from 10 CFR 52, Appendix D, Section III.B would not present an undue risk to the health and safety of the public.

3. **The exemption is consistent with the common defense and security**

   The requested exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow the licensee to depart from elements of the plant specific DCD Tier 1 design information. The proposed exemption does not adversely affect the design, function, or operation of any structures or plant equipment that are necessary to maintain a safe and secure status of the plant. The proposed exemption has no impact on plant security or safeguards procedures.

Therefore, the requested exemption is consistent with the common defense and security.

4. Special circumstances are present

10 CFR 50.12(a)(2) lists six "special circumstances" for which an exemption may be granted. Pursuant to the regulation, it is necessary for one of these special circumstances to be present in order for the NRC to consider granting an exemption request. The requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii). That subsection defines special circumstances as when "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

The rule under consideration in this request for exemption is 10 CFR 52, Appendix D, Section III.B, which requires that a licensee referencing the AP1000 Design Certification Rule (10 CFR Part 52, Appendix D) shall incorporate by reference and comply with the requirements of Appendix D, including Tier 1 information. The VEGP Units 3 and 4 COLs reference the AP1000 Design Certification Rule and incorporate by reference the requirements of 10 CFR Part 52, Appendix D, including Tier 1 information. The underlying purpose of Appendix D, Section III.B is to describe and define the scope and contents of the AP1000 design certification, and to require compliance with the design certification information in Appendix D.

The proposed exemption would revise the inspections and acceptance criteria for the safety-related spent fuel pool makeup sources.

The proposed revisions to the inspections and acceptance criteria on the safety-related SFP makeup sources, discussed in Section 2.0, maintain the required design functions of the SFP to remove decay heat from the spent fuel. The revisions to the ITAAC ensure there is adequate makeup water as determined by the SFP heatup and boiloff analysis. The proposed changes do not adversely affect any function or feature used for the prevention and mitigation of accidents or their safety analyses. No safety-related structure, system, or component (SSC) or function is adversely affected. The proposed changes do not adversely affect any SSC accident initiator or initiating sequence of events related to the accidents evaluated. Accordingly, this exemption from the certification information will enable the Licensee to safely construct and operate the AP1000 facility consistent with the design certified by the NRC in 10 CFR 52, Appendix D.

Therefore, special circumstances are present, because application of the current generic certified design information in Tier 1 as required by 10 CFR Part 52, Appendix D, Section III.B, in the particular circumstances discussed in this request is not necessary to achieve the underlying purpose of the rule.

5. The special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption.

Based on the nature of the changes to the plant-specific Tier 1 information and the understanding that these changes support the design function of the SFP, it is expected that this exemption may be requested by other AP1000 licensees and applicants.

However, even if other AP1000 licensees and applicants do not request this same exemption, the special circumstances will continue to outweigh any decrease in safety from the reduction in standardization because the key design functions of the structures associated with this request will continue to be maintained. Furthermore, the justification provided in the license amendment request and this exemption request and the associated mark-ups demonstrate that there is a limited change from the standard information provided in the generic AP1000 DCD, which is offset by the special circumstances identified above.

Therefore, the special circumstances associated with the requested exemption outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption.

6. The design change will not result in a significant decrease in the level of safety.

The exemption revises the plant-specific DCD Tier 1 information by revising the inspections and acceptance criteria on the SFP safety-related makeup sources as discussed in Section 2.0. The revisions to the inspections and acceptance criteria on the SFP safety-related makeup sources do not change the design requirements of the makeup sources. Because these functions continue to be met, there is no reduction in the level of safety.

5.0 Risk Assessment

A risk assessment was not determined to be applicable to address the acceptability of this proposal.

6.0 Precedent Exemptions

None

7.0 Environmental Consideration

The Licensee requests a departure from elements of the certified information in Tier 1 of the generic AP1000 DCD. The Licensee has determined that the proposed departure would require a permanent exemption from the requirements of 10 CFR 52, Appendix D, *Design Certification Rule for the AP1000 Design,* Section III.B, *Scope and Contents,* with respect to installation or use of facility components located within the restricted area, as defined in 10 CFR Part 20, or which changes an inspection or a surveillance requirement; however, the Licensee evaluation of the proposed exemption has determined that the proposed exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Based on the above review of the proposed exemption, the Licensee has determined that the proposed activity does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore,

pursuant to 10 CFR 51.22(b), an environmental impact statement or environmental assessment of the proposed exemption is not required.

Specific details of the environmental considerations supporting this request for exemption are provided in Section 5 of the associated License Amendment Request provided in Enclosure 1 of this letter.

8.0 Conclusion

The proposed changes to Tier 1 are necessary to revise the inspections and acceptance criteria on the SFP safety-related makeup sources. The exemption request meets the requirements of 10 CFR 52.63, *Finality of design certifications*, 10 CFR 52.7, *Specific exemptions*, 10 CFR 50.12, *Specific exemptions*, and 10 CFR 52 Appendix D, *Design Certification Rule for the AP1000 Design*. Specifically, the exemption request meets the criteria of 10 CFR 50.12(a)(1) in that the request is authorized by law, presents no undue risk to public health and safety, and is consistent with the common defense and security, as well as providing the special circumstances criteria of 10 CFR 50.12(a)(2)(ii). Furthermore, approval of this request does not result in a significant decrease in the level of safety, satisfies the underlying purpose of the AP1000 Design Certification Rule, and does not present a significant decrease in safety as a result of a reduction in standardization.

9.0 References

None

Southern Nuclear Operating Company

ND-17-1145

Enclosure 3

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Proposed Changes to Licensing Basis Documents

(LAR-17-021)

Insertions Denoted by Blue Underline and Deletions by Red Strikethrough
Omitted text is identified by three asterisks (* * *)

(This Enclosure consists of 10 pages, including this cover page)

COL Appendix C Table 2.3.7-4 and corresponding Plant-Specific DCD Tier 1 Table 2.3.7-4

Table 2.3.7-4
Inspections, Tests, Analyses, and Acceptance Criteria

No.	ITAAC No.	Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
	* * *	* * *	* * *	* * *
402	2.3.07.07b.i	7.b) The SFS provides spent fuel cooling for 7 days by boiling the spent fuel pool water and makeup water from on-site storage tanks.	i) Inspection will be performed to verify that the spent fuel pool includes a sufficient volume of water.	i) The volume of the spent fuel pool, ~~and~~ fuel transfer canal, and both gate areas above the fuel assemblies and ~~to the elevation 6 feet~~ below the spent fuel pool cooling suction piping ~~operating deck~~ is greater than or equal to 130,350 ~~129,500~~ gallons.
403	2.3.07.07b.ii	7.b) The SFS provides spent fuel cooling for 7 days by boiling the spent fuel pool water and makeup water from on-site storage tanks.	ii) Inspection will be performed to verify the cask washdown pit includes sufficient volume of water.	ii) The water volume of the cask washdown pit from the cask washdown pit floor to 13.75 feet above the cask washdown pit floor is greater than or equal to 34,100 ~~30,900~~ gallons.
	* * *	* * *	* * *	* * *
	2.3.07.07b.vii	7.b) The SFS provides spent fuel cooling for 7 days by boiling the spent fuel pool water and makeup water from on-site storage tanks.	vii) Inspection will be performed to verify the cask loading pit includes sufficient volume of water.	vii) The water volume of the cask loading pit above the bottom of the gate and below the spent fuel pool cooling suction piping is greater than or equal to 46,050 gallons.

Note: The COL Index Number is to be assigned by the NRC at the time of amendment issuance; therefore, it is not shown in the markup above for ITAAC No. 2.3.07.07b.vii.

Technical Specification 3.3.9, Engineered Safety Feature Actuation System (ESFAS) Manual Initiation

Table 3.3.9-1 (page 1 of 2)
Engineered Safeguards Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS
......*			
8. Passive Containment Cooling Actuation - Manual Initiation	1,2,3,4 5[f] 6[f]	*...*...*	*...*...*
......*			
......*			

(f) With decay heat > ~~6.0~~7.0 MWt.

Technical Specification 3.3.19, Diverse Actuation System (DAS) Manual Controls

Table 3.3.19-1 (page 1 of 1)
DAS Manual Controls

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CONTROLS
......*		
10. Passive containment cooling drain valves	1,2,3,4,5[b],6[b]	*...*...*
......*		

(b) With the reactor decay heat > ~~6.0~~7.0 MWt.

Technical Specification 3.6.6, Passive Containment Cooling System (PCS)

LCO 3.6.6 The passive containment cooling system shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,
MODES 5 and 6 with the reactor decay heat > ~~6.0~~7.0 MWt.

Technical Specification 3.7.9, Spent Fuel Pool Makeup Water Sources

LCO 3.7.9 Spent fuel pool makeup water sources shall be OPERABLE.

- NOTES -

1. OPERABILITY of the cask washdown pit is required when the spent fuel pool decay heat > ~~4.7~~4.0 MWt and ≤ ~~7.2~~7.0 MWt.

2. OPERABILITY of the cask loading pit is required when the spent fuel pool decay heat > ~~5.6~~5.0 MWt and ≤ ~~7.2~~7.0 MWt.

3. OPERABILITY of the Passive Containment Cooling Water Storage Tank (PCCWST) is required as a spent fuel pool makeup water source when the spent fuel pool decay heat > ~~7.2~~7.0 MWt. If the reactor decay heat is > ~~6.0~~7.0 MWt, the PCCWST must be exclusively available for containment cooling in accordance with LCO 3.6.6.

4. OPERABILITY of the Fuel Transfer Canal is required.

APPLICABILITY: When irradiated fuel assemblies are stored in the spent fuel pool.
~~During storage of fuel in the spent fuel pool with a decay heat > 4.7 MWt.~~

......*

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.9.1	---------- **- NOTE -** Only required to be performed when spent fuel pool decay heat is > ~~7.2~~7.0 MWt. ---------- Verify one passive containment cooling system, motor-operated valve in each flow path is closed and locked, sealed, or otherwise secured in position.	7 days
SR 3.7.9.2	---------- **- NOTE -** Only required to be performed when spent fuel pool decay heat is > ~~7.2~~7.0 MWt. ---------- Verify the PCCWST volume is ≥ 756,700 gallons.	7 days
SR 3.7.9.3	---------- **- NOTE -** Only required to be performed when spent fuel pool decay heat is ≤ ~~7.2~~7.0 MWt. ---------- Verify the water level in the cask washdown pit is ≥ 13.75 ft.	31 days
SR 3.7.9.4	---------- **- NOTE -** Only required to be performed when spent fuel pool decay heat is > ~~5.6~~5.0 MWt and ≤ ~~7.2~~7.0 MWt. ---------- Verify the water level in the cask loading pit is ≥ 43.9 ft. and in communication with the spent fuel pool.	31 days
SR 3.7.9.5	Verify the fuel transfer canal is in communication with the spent fuel pool.	31 days
SR 3.7.9.~~5~~6	Verify the spent fuel pool makeup isolation valves PCS-PL-V009, PCS-PL-V045, PCS-PL-V051, SFS-PL-V042, SFS-PL-V045, SFS-PL-V049, SFS-PL-V066, and SFS-PL-V068 are OPERABLE in accordance with the Inservice Testing Program.	In accordance with the Inservice Testing Program

Updated Final Safety Analysis Report (UFSAR)

UFSAR Subsection 6.2.2.4.2, Preoperational Testing

* * *

With either a temporary water supply or the passive containment cooling ancillary water storage tank connected to the suction of the recirculation pumps and with either of the two pumps operating, flow must be provided simultaneously to the passive containment cooling water storage tank ~~at greater than or equal to 100 gpm~~ and to the spent fuel pool for the following cases:

- Greater than or equal to 100 gpm to the passive containment cooling water storage tank and greater than or equal to 35 gpm to the spent fuel pool
- Greater than or equal to 80 gpm to the passive containment cooling water storage tank and greater than or equal to 50 gpm to the spent fuel pool
- Greater than or equal to 50 gpm to the passive containment cooling water storage tank and greater than or equal to 80 gpm to the spent fuel pool

~~at greater than or equal to 35 gpm. This must also be accomplished at simultaneous flow rates greater than or equal to 80 gpm to the passive containment cooling water storage tank and greater than or equal to 50 gpm to the spent fuel pool. Temporary instrumentation or changes in the passive containment cooling water storage tank level will be utilized to verify the flow rates.~~

* * *

UFSAR Table 6.2.2-1, Passive Containment Cooling System Performance Parameters

Table 6.2.2-1
Passive Containment Cooling System Performance Parameters

……*

NOTES

……*

7. These flow rates apply when the plant is not refueling. ~~The minimum makeup flow rates required when the plant is being refueled are 80 gpm to the containment and 50 gpm to the spent fuel pool.~~ The minimum makeup flow rates are adjusted following a design basis loss of normal spent fuel pool cooling that occurs during a refueling because more decay heat is located in the spent fuel pool and less decay heat is located in the reactor. See Subsections 6.2.2.4.2 and 9.1.3 for additional details.

UFSAR Subsection 9.1.3.4.3, Abnormal Conditions

The AP1000 spent fuel pool cooling system is not required to operate to mitigate design basis events. In the event the spent fuel pool cooling system is unavailable, spent fuel cooling is provided by the heat capacity of the water in the ~~pool~~ spent fuel pool and its connected safety-related spent fuel pool makeup water sources for the first 72 hours following a loss of normal spent fuel pool cooling. The spent fuel pool connected safety-related makeup water sources include the fuel transfer canal, the cask loading pit, and the cask washdown pit and can include PCS when it is not required to be dedicated for containment cooling. Connections to the spent fuel pool are made at an elevation to preclude the possibility of inadvertently draining the water in the pool to an unacceptable level.

......*

- When the calculated decay heat level in the spent fuel pool is less than or equal to ~~4.7~~4.0 MWt, ~~no makeup~~ only the safety-related makeup from the fuel transfer canal is needed to achieve spent fuel pool cooling for at least 72 hours.

- When the calculated decay heat level in the spent fuel pool is greater than ~~4.7~~4.0 MWt and less than or equal to ~~5.6~~5.0 MWt, safety related makeup from the fuel transfer canal and cask washdown pit is sufficient to *...*...*

- When the calculated decay heat level in the spent fuel pool is greater than ~~5.6~~5.0 MWt and less than or equal to ~~7.2~~7.0 MWt, safety-related makeup from the fuel transfer canal, cask washdown pit and cask *...*...*

- When calculated decay heat level in the spent fuel pool is greater than ~~7.2~~7.0 MWt makeup *...*...*

- When the decay heat level in the reactor is ~~at or below 6.0 MW~~ less than or equal to 7.0 MWt, the passive containment cooling water storage tank is not needed for containment *...*...*

- When the decay heat level in the reactor is greater than ~~6 MW~~7.0 MWt, the water in the *...*...*

Table 9.1-4 provides the calculated timing and spent fuel pool water levels for several limiting event scenarios which would require makeup to the spent fuel pool.

Alignment of the fuel transfer canal is accomplished by opening the gate, shown in Figure 9.1-6, located between the fuel transfer canal and spent fuel pool.
......*

Alignment of the cask loading pit is accomplished by opening the gate, shown in Figure 9.1-6, located between the cask loading pit and the spent fuel pool. The cask loading pit gate should be opened prior to exceeding ~~5.6~~5.0 MWt in the spent fuel pool.

......*

The flow rates provided from the passive containment cooling ancillary water storage tank (PCCAWST) to the spent fuel pool by the recirculation pumps depend on the plant condition and spent fuel decay heat. Postulated events require SFP makeup water from the PCCAWST 72 hours following a seismic event combined with a station blackout. The required flow rates provide sufficient makeup to the spent fuel pool to keep the fuel covered as the water boils off. A 35 gpm flow rate is required when the plant has been operating at full power, shortly after startup from a refueling outage and the spent fuel pool decay heat is ≤ 5.0 MWt. A 50 gpm flow rate is required when the plant is being refueled and the spent fuel pool decay heat is > 5.0 MWt and ≤ 7.0 MWt. An 80 gpm flow rate is required when the plant is being refueled and the spent fuel pool decay heat level is > 7.0 MWt. ~~are 35 gpm or 50 gpm. These are the required flow rates to provide sufficient makeup to the spent fuel pool to keep the fuel covered as the pool water boils off. The plant condition associated with 35 gpm is a loss of power combined with a seismic event when the plant is operating at full power, shortly after startup from a refueling outage. The plant condition associated with 50 gpm is also a loss of power combined with a seismic event, but when the plant is being refueled. This~~ The refueling scenarios consider~~s~~ the time between completion of plant cooldown and just prior to plant startup once the refueling is complete. With a refueling scenario, additional decay heat is located in the spent fuel pool because of the recent offload and enough decay heat remains in the reactor vessel such that the PCCWST is still required for containment cooling and cannot be used for spent fuel pool makeup. These conditions result in the maximum flow required from the PCCAWST because cooling water must be supplied to both the PCCWST and the spent fuel pool to provide both containment and spent fuel cooling for a period of four days following the initial three days of passive systems operation.

UFSAR Subsection 9.1.3.6.1.3, Dimensional Inspections

The contained volumes of water in the spent fuel pool, fuel transfer canal, ~~and~~ the cask washdown pit, and the cask loading pit are used for cooling the spent fuel by boiling after a prolonged loss of normal spent fuel pool cooling.

* * *

UFSAR Table 9.1-2, Spent Fuel Pool Cooling and Purification System Design Parameters

Table 9.1-2
Spent Fuel Pool Cooling and Purification System Design Parameters

......*

Fuel transfer canal~~, including gate,~~ water volume (including gate area) at water level of 15 inches below the operating deck (gallons)	63,500
Minimum combined volume of spent fuel pool, ~~and~~ fuel transfer canal, and both gate areas (above the fuel assemblies to the bottom of the spent fuel cooling suctionpiping) ~~above fuel to elevation 6 feet below the operating deck)~~ (gallons)	~~129,500~~130,350
Minimum volume of the cask washdown pit from the cask washdown pit floor to 13.75 feet above the cask washdown pit floor (gallons)	~~30,900~~34,100
Minimum volume of the cask loading pit from the bottom of the cask loading pit gate to the bottom of the spent fuel pool cooling suction piping (gallons)	46,050
Nominal boron concentration of water (ppm)	*...*...*

......*

UFSAR Table 9.1-4, Station Blackout/Seismic Event Times

Table 9.1-4
Station Blackout/Seismic Event Times(1)(9)

Event	Time to Saturation(1) (hours)	Height of Water Above Fuel at 72 Hours(4) (feet)	Height of Water Above Fuel at 7 Days(4) (feet)
Seismic Event(2) – Power Operation Immediately Following a Refueling(7)	~~7.38~~ 6.0	~~1.4(6)~~ 0.5	~~1.4(6)~~ 0.5(6)
Seismic Event(8) – Refueling, Immediately Following Spent Fuel Region Offload(3)(7)	~~5.59~~ 4.5	~~4.2(5)~~ 1.0(5)	~~4.2(5)~~ 1.0(6)
Seismic Event(8) – Refueling, Emergency Full Core Off-Load(3) Immediately Following Refueling(7)	~~2.33~~ 2.0	8.0(5)	8.0(6)

Notes:

……*

2. Seismic event assumes water in the pool is initially drained to the level of the spent fuel pool cooling system connection simultaneous with a station blackout. Fuel cooling water sources are the spent fuel pool, fuel transfer canal, both gate areas~~(including gate)~~, and cask washdown pit for 72 hours. Between 72 hours and 7 days fuel cooling water provided from passive containment cooling system ancillary water storage tank.

……*

5. Alignment of PCS water storage for supply of makeup water permits maintaining pool level at this elevation. Decay heat in reactor vessel is at or below ~~6.0 MW~~7.0 MWt, thus no PCS water is required for containment cooling for 72 hours.
6. *…*…*
7. The number of fuel assemblies refueled has been conservatively established to include the worst case ~~between~~ for an 18-month fuel cycle plus 5 defective fuel assemblies (69 total assemblies or 44% of the core) ~~and a 24-month fuel cycle plus 5 defective fuel assemblies (77 total assemblies or 49% of the core)~~.
8. Seismic event assumes water in the pool is initially drained to the level of the spent fuel pool cooling system connection simultaneous with a station blackout. Fuel cooling water sources are the spent fuel pool, fuel transfer canal, both gate areas~~(including gate)~~, cask washdown pit, cask loading pit, and passive containment cooling system water storage tank for 72 hours.

……*

Southern Nuclear Operating Company

ND-17-1145

Enclosure 4

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Conforming Technical Specification Bases Changes

(LAR-17-021)

(For Information Only)

Insertions Denoted by Blue Underline and Deletions by Red Strikethrough
Omitted text is identified by three asterisks (* * *)

(This Enclosure consists of 1 pages, including this cover page)

Technical Specification Bases B 3.3.9, Engineered Safety Feature Actuation System (ESFAS) Manual Initiation

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY (continued)

......*

8. Passive Containment Cooling Actuation - Manual Initiation

......*

The LCO requires this Function to be OPERABLE in MODES 1, 2, 3, and 4 when the potential exists for a DBA that could require the operation of the Passive Containment Cooling System. In MODES 5 and 6, with decay heat ~~more~~greater than ~~6.0~~7.0 MWt, manual initiation of the PCS provides containment heat removal. Section B 3.6.6, Applicability, provides the basis for the decay heat limit.

Technical Specification Bases B 3.6.6, Passive Containment Cooling System (PCS)

APPLICABILITY *...*...*

OPERABILITY of the PCS is required in either MODE 5 or 6 with the reactor decay heat (normally determined by calculation) greater than ~~6~~7.0 MWt for heat removal in the event of a loss of nonsafety decay heat removal capabilities. With the decay heat at or below ~~6.0~~7.0 MWt, the decay heat can be removed from containment with air cooling alone for 72 hours. Confirmation of decay heat levels may be determined

Technical Specification Bases B 3.7.5, Spent Fuel Pool Water Level

APPLICABLE SAFETY ANALYSES *...*...*

In addition to mitigation of the effects of a fuel handling accident, the required minimum water level in the spent fuel pool and connected fuel transfer canal provides a large capacity heat sink for spent fuel pool cooling in the event the spent fuel pool cooling system is unavailable.

......*

Technical Specification Bases B 3.7.9, Spent Fuel Pool Makeup Water Sources

BACKGROUND

The spent fuel pool is normally cooled by the nonsafety spent fuel pool cooling system. In the event the normal cooling system is unavailable, the spent fuel pool can be cooled by the normal residual heat removal system. Alternatively, the spent fuel pool and fuel transfer canal contain~~s~~ sufficient water inventory for decay heat removal by boiling. To support extended periods of loss of normal pool cooling, makeup water is required to provide additional cooling by boiling. Both safety and non-safety makeup water sources are available on-site.

~~Three s~~ Safety-related, gravity fed sources of makeup water are provided to the spent fuel pool. These makeup water sources contain sufficient water to maintain spent fuel pool cooling for 72 hours. When irradiated fuel is in the spent fuel pool, the fuel transfer canal, with the gate open, must be available to provide makeup water to the spent fuel pool. When the spent fuel pool decay heat is > ~~4.7~~4.0 MWt and ≤ ~~7.2~~7.0 MWt, the fuel transfer canal and cask washdown pit must be available to provide makeup to the spent fuel pool. When the spent fuel pool decay heat is > ~~5.6~~5.0 MWt and ≤ ~~7.2~~7.0 MWt ~~both~~ the fuel transfer canal, the cask washdown pit, and the cask loading pit must be available to provide makeup to the spent fuel pool. When the spent fuel pool decay heat is > ~~7.2~~7.0 MWt and the reactor decay heat is ≤ ~~6.0~~7.0 MWt, the Passive Containment Cooling Water Storage Tank (PCCWST) must be available

......*

Once decay heat in the spent fuel pool is reduced to ≤ ~~4.7~~4.0 MWt, the spent fuel pool water inventory, as required by LCO 3.7.5, Spent Fuel Pool Water Level, and fuel transfer canal inventory is sufficient, without makeup, to maintain the spent fuel pool for 72 hours. ~~When the spent fuel pool decay heat load is ≤ 5.6 MWt for the cask loading pit and ≤ 4.7 MWt for the cask washdown pit, the pits are no longer required to be OPERABLE for spent fuel pool makeup.~~

......*

APPLICABLE SAFETY ANALYSES

In the event the normal spent fuel pool cooling system is unavailable, the spent fuel cooling is provided by the heat capacity of the ~~water in~~ spent fuel pool and spent fuel pool makeup water sources available to the pool. The worst case decay heat load (decay heat > ~~7.2~~7.0 MWt) is produced by a full core off-load following a refueling plus ~~ten~~ fifteen years of spent fuel. The worst case event is a seismic event concurrent with a station blackout where the spent fuel pool cooling suction line to the spent fuel pool is assumed to fail, and the water in the pool and makeup sources are assumed to drain to the bottom elevation of the spent fuel pool cooling suction piping attachment to the spent fuel pool. For this case the spent fuel pool and fuel transfer canal inventory provided by the water over the stored fuel and below the pump suction connection is capable of cooling the spent fuel pool without boiling for at least ~~2.5~~2.0 hours, following a loss of normal spent fuel pool cooling. After boiling starts, makeup water may be required to replace water lost by boiling and is available, without offsite support, via the PCCWST.

The requirements of LCO 3.6.6, "Passive Containment Cooling System," are applicable in MODES 1, 2, 3, and 4, and MODES 5 and 6 with reactor decay heat > ~~6.0~~7.0 MWt. LCO 3.6.6 requires availability of the containment cooling water tank for containment heat removal. At or below ~~6.0~~7.0 MWt reactor decay heat, containment air cooling is adequate for 72 hours without support from the PCCWST, which can then provide a makeup water source for the spent fuel pool.

......*

LCO

The spent fuel pool makeup water sources are required to contain the following amounts of water to be considered OPERABLE:

- Fuel transfer canal with the gate open in communication with the spent fuel pool (which will establish water level as required by LCO 3.7.5, Spent Fuel Pool Water Level).
- Cask washdown pit water level must be ≥ 13.75 ft and capable of being manually aligned.
- Cask loading pit water level must be ≥ 43.9 ft with the gate open in communication with the spent fuel pool.
- PCCWST is required to contain ≥ 756,700 gallons of water.

......*

Note 1 specifies that the cask washdown pit is required to be OPERABLE when the spent fuel pool decay heat is > ~~4.7~~4.0 MWt and ≤ ~~7.2~~7.0 MWt.

Note 2 specifies that the cask loading pit is required to be OPERABLE when the spent fuel pool decay heat is > ~~5.6~~5.0 MWt and ≤ ~~7.2~~7.0 MWt.

Note 3 specifies that the PCCWST is required to be OPERABLE when the spent fuel pool decay heat is > ~~7.2~~7.0 MWt, which is normal following a full core off load. The larger makeup source is necessary for the higher decay heat load. In MODES 5 and 6, with the calculated reactor decay heat > ~~6.0~~7.0 MWt, the PCCWST is reserved for containment cooling in accordance with LCO 3.6.6, Passive Containment Cooling System (PCS). Thus, fuel movement from the reactor to the spent fuel pool must be suspended until reactor decay heat is ≤ ~~6.0~~7.0 MWt if the fuel movement will increase the spent fuel pool decay heat to > ~~7.2~~7.0 MWt.

Note 4 specifies that the fuel transfer canal is required to be OPERABLE when irradiated fuel is in the spent fuel pool.

......*

APPLICABILITY

This LCO applies during storage of irradiated fuel in the spent fuel pool. Irradiated fuel assemblies generate decay heat and the required makeup sources provide for 3 days of cooling in the event of a station blackout with seismic event, which results in the ~~with a decay heat (normally determined by calculation) > 4.7~~4.0 ~~MWt. With decay heat ≤ 4.7~~4.0 ~~MWt, the assumed~~ spent fuel pool water inventory at the bottom of ~~(i.e., level below~~ the pump suction connection to the pool ~~provides for 3 days of cooling without makeup~~.

ACTIONS

......*

A.1

If the fuel transfer canal, cask washdown pit (with spent fuel pool decay heat > ~~4.7~~4.0 and ≤ ~~7.2~~7.0 MWt), the cask loading pit (with spent fuel pool decay heat > ~~5.6~~5.0 MWt and ≤ ~~7.2~~7.0 MWt), or the PCCWST (with spent fuel pool decay heat > ~~7.2~~7.0 MWt) is inoperable, Action must be initiated immediately to restore the makeup source or its associated flow path to OPERABLE status.

......*

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.9.3

This SR verifies sufficient cask washdown pit water volume is available in the event of a loss of spent fuel cooling. The 13.75 ft level specified provides makeup water for stored fuel with decay heat (normally determined by calculation) > ~~4.7~~4.0 and ≤ ~~7.2~~7.0 MWt. The cask washdown pit is no longer required when the decay heat level requires that the PCCWST is OPERABLE for spent fuel pool usage.

The 31 day Frequency is appropriate because the cask washdown pit has only one drain line which is isolated by series manual valves which are only operated in accordance with plant procedures, thus providing assurance that inadvertent level reduction is not likely.

SR 3.7.9.4

This SR verifies sufficient cask loading pit water volume is available and connected to the spent fuel pool such that no action is required in the fuel handling area, in the event of a loss of spent fuel cooling. The 43.9 foot level specified provides makeup water for stored fuel with decay heat (normally determined by calculation) > ~~5.6~~5.0 and ≤ ~~7.2~~7.0 MWt. The cask loading pit is no longer required when the decay heat level requires that the PCCWST is OPERABLE for spent fuel pool usage.

SR 3.7.9.5

This SR verifies sufficient fuel transfer canal water volume is available and connected to the spent fuel pool such that no action is required in the fuel handling area, in the event of a loss of spent fuel cooling.

The 31 day Frequency is appropriate because the fuel transfer canal has only one drain line isolated by a locked-closed manual valve and is isolated from the refueling cavity by a gate valve and blind flange. Connections to the fuel transfer canal are operated only in accordance with plant procedures. This provides assurance that inadvertent level reduction is not likely.

SR 3.7.9.~~5~~6

This SR requires verification of the OPERABILITY of the manual makeup

* * *