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10CFR50.90

November 24, 2020

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

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Renewed Facility Operating License Nos. DPR-53 and DPR-69
Docket Nos. 50-317 and 50-318

Subject: Application to Revise Technical Specifications to Adopt TSTF-567 Rev 1, "Add Containment Sump TS to Address GSI-191 Issues"

References:

1. Letter from James Barstow (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, Final Response to Generic Letter 2004-02," dated August 13, 2018," (ML18226A189)

2. Letter from David T Gudger (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission - "Withdrawal of License Amendment Request for Calvert Cliffs Nuclear Power Plant, Units 1 and 2 - Final Response to Generic Letter 2004-02," dated October 21, 2019 (ML19294A056)

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (Exelon) requests changes to the Technical Specifications (TS) of the Calvert Cliffs Nuclear Power Plant, Units 1 and 2 (CCNPP).

The proposed changes would revise TS 3.5.2, "ECCS [Emergency Core Cooling System] – Operating," and TS 3.5.3, "ECCS – Shutdown," and TS 5.5.15, "Safety Function Determination Program (SFDP). The proposed changes would also add a new TS 3.6.9 "Containment Emergency Sump," to Section 3.6, "Containment Systems," and an associated Surveillance Requirement (SR 3.6.9.1). These proposed changes are consistent with NRC-approved Technical Specification Task Force (TSTF) Standard Technical Specification Traveler, TSTF-567, Revision 1, "Add Containment Sump TS to Address GSI-191 Issues."

The proposed changes had been initially included in conjunction with the GL-2004-02 Final Response on August 13, 2018 (Reference 1) and subsequently withdrawn on October 21, 2019 (Reference 2).

Attachment 1 provides a description and evaluation of the proposed change. Attachment 2 provides a markup of the affected TS. Attachment 3 provides revisions of the affected TS Bases pages. The TS Bases pages are provided for information only and do not require NRC approval.

The proposed change had been previously reviewed by the Plant Operations Review Committee for the Reference 1 submittal and no new changes have occurred since then.

Exelon requests approval of the proposed license amendment by November 24, 2021. Once approved, the amendment shall be implemented within 60 days of receipt. There are no regulatory commitments contained within this letter.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b), Exelon is notifying the State of Maryland of this application for license amendment by transmitting a copy of this letter and its attachments to a designated State Official.

Should you have any questions concerning this letter, please contact Frank Mascitelli at (610) 765-5512.

I declare under penalty of perjury that the foregoing is true and correct. This statement was executed on the 24th Day of November 2020.

Respectfully,

David P. Helker
Sr. Manager - Licensing
Exelon Generation Company, LLC

Attachments:
1. Evaluation of Proposed Change
2. Markup of Proposed Technical Specification Pages
3. Revised Technical Specification Bases Pages

cc: Regional Administrator, Region I, USNRC
USNRC Senior Resident Inspector, CCNPP
Project Manager [CCNPP] USNRC
S. Seaman, State of Maryland

ATTACHMENT 1

Evaluation of Proposed Changes

Calvert Cliffs Nuclear Power Station, Units 1 and 2

Renewed Facility Operating License Nos. DPR-53 and DPR-69

Docket Nos. 50-317 and 50-318

Subject: Application to Revise Technical Specifications to Adopt TSTF-567 Rev 1, "Add Containment Sump TS to Address GSI-191 Issues"

1.0 DESCRIPTION

Exelon Generation Company, LLC (Exelon), proposes changes to the Technical Specifications (TS), Appendix A of Renewed Facility Operating License Nos. DPR-53 and DPR-69 for Calvert Cliffs Nuclear Power Plant, Units 1 and 2 (CCNPP), respectively.

Exelon is proposing administrative changes to TS 3.5.2, "ECCS – Operating" and TS 3.5.3, "ECCS – Shutdown" and a new TS 3.6.9 for the containment emergency sump. The proposed amendment also revises the Safety Function Determination Program to clarify its application when a supported system is made inoperable by the inoperability of a single Technical Specification support system.

<u>Administrative change to TS 3.5.2, ECCS [Emergency Core Cooling System] – Operating</u>
The administrative change to TS 3.5.2 is to remove SR 3.5.2.8 to *verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet strainers show no evidence of structural distress or abnormal corrosion* and relocate this SR to the proposed new TS 3.6.9.

<u>Administrative change to TS 3.5.3, ECCS – Shutdown</u>
The administrative change to TS 3.5.3 is to remove SR 3.5.2.8 from SR 3.5.3.1 as this SR is being relocated to the proposed new TS 3.6.9.

<u>New TS 3.6.9, Containment Emergency Sump</u>
The new proposed TS 3.6.9 applies in MODES 1, 2, 3, and 4. The evaluation is performed assuming that the plant is at-power when the initiating event occurs. Consequently, the debris generation and transport are based on normal operating temperature and pressure conditions. Those conditions maximize the break zones of influence and initial decay heat.

<u>New TS 5.5.15, Safety Function Determination Program</u>
The proposed amendment also revises the Safety Function Determination Program to clarify its application when a supported system is made inoperable by the inoperability of a single Technical Specification support system. The following statement is added to the end of TS 5.5.15, "Safety Function Determination Program (SFDP)":

"When a loss of safety function is caused by the inoperability of a single Technical Specification support system, the appropriate Conditions and Required Actions to enter are those of the support system."

The changes proposed above are consistent with TSTF-567 Revision 1.

2.0 ASSESSMENT

2.1 Applicability of Published Safety Evaluation

Exelon has reviewed the NRC safety evaluation provided to the Technical Specifications Task Force on July 3, 2018 (Reference 1), as well as the information provided in TSTF-567 Revision 1. Exelon has concluded that the justifications presented in TSTF-567 Revision 1 and the safety evaluation prepared by the NRC staff are applicable to CCNPP and justify this amendment request for the incorporation of the changes to the CCNPP TS.

The following CCNPP TS are related to the Containment Emergency Sump and are affected by the proposed changes:

3.5.2 ECCS - Operating
3.5.3 ECCS - Shutdown
3.6.9 Containment Emergency Sump (new)
5.5.15 Safety Function Determination Program (SFDP)

2.2 Variations

Exelon is proposing no variations from the TS changes described in TSTF-567 Revision 1. Minor administrative variations do not affect the applicability of TSTF-567 Revision 1 or the NRC staff's safety evaluation to the proposed license amendment.

Exelon proposes to change the number for the Containment Sump TS to TS 3.6.9 and the Containment Sump SR to 3.6.9.1. Exelon also proposes to add an additional word “Emergency” such that the title of the LCO is “Containment Emergency Sump.” These differences are administrative in nature and do not affect the applicability of TSTF-567 Revision 1 to the CCNPP TS.

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Determination

Exelon Generation Company, LLC (Exelon), proposes changes to the Technical Specifications (TS), Appendix A of Renewed Facility Operating License Nos. DPR-53 and DPR-69 for Calvert Cliffs Nuclear Power Plant Units 1 and 2 (CCNPP), respectively.

The proposed amendment adds a new Technical Specification (TS) 3.6.9, “Containment Emergency Sump” and adds an Action to address the condition of the containment emergency sump made inoperable due to containment accident generated and transported debris exceeding analyzed limits. The Action provides

time to correct or evaluate the condition in lieu of an immediate plant shutdown. This Action is placed in a new specification on the containment emergency sump that otherwise retains the existing Technical Specification requirements. An existing Surveillance Requirement (SR) is moved from TS 3.5.2 to the new specification. The requirement to perform the SR in TS 3.5.3 is deleted.

The proposed amendment also revises the Safety Function Determination Program to clarify its application when a supported system is made inoperable by the inoperability of a single Technical Specification support system

Exelon has evaluated whether a significant hazards consideration is involved with the proposed changes by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No.

The proposed change adds a new specification to the TS for the containment emergency sump. An existing SR on the containment sump is moved to the new specification and a duplicative requirement to perform the SR in TS 3.5.3 is removed. The new specification retains the existing requirements on the containment emergency sump and the actions to be taken when the containment emergency sump is inoperable with the exception of adding new actions to be taken when the containment emergency sump is inoperable due to containment accident generated and transported debris exceeding the analyzed limits. The new action provides time to evaluate and correct the condition instead of requiring an immediate plant shutdown.

The containment emergency sump is not an initiator of any accident previously evaluated. The containment emergency sump is a passive component and the proposed change does not increase the likelihood of the malfunction. As a result, the probability of an accident is unaffected by the proposed change.

The containment emergency sump is used to mitigate accidents previously evaluated by providing a borated water source for the Emergency Core Cooling System (ECCS) and Containment Spray System (CSS). The design of the containment emergency sump and the capability of the containment emergency sump assumed in the accident analysis is not changed. The proposed action requires implementation of mitigating actions while the containment emergency sump is inoperable and more frequent monitoring of reactor coolant leakage to detect any increased potential for an accident that would require the containment emergency sump. The consequences of an accident during the proposed action are no different than the current consequences of an accident if the containment emergency sump is inoperable.

The proposed change clarifies the Safety Function Determination Program when a supported system is made inoperable by the inoperability of a single Technical Specification support system. The Safety Function Determination Program directs

the appropriate use of TS actions and the proposed change does not alter the current intent of the TS. The actions taken when a system is inoperable are not an assumption in the initiation or mitigation of any previously evaluated accident.

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

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

Response: No.

The proposed change adds a new specification to the TS for the containment emergency sump. An existing SR on the containment emergency sump is moved to the new specification and a duplicative requirement to perform the SR in TS 3.5.3 is removed. The new specification retains the existing requirements on the containment emergency sump and the actions to be taken when the containment emergency sump is inoperable with the exception of adding new actions to be taken when the containment emergency sump is inoperable due to containment accident generated and transported debris exceeding the analyzed limits. The new action provides time to evaluate and correct the condition instead of requiring an immediate plant shutdown.

The proposed change does not alter the design or design function of the containment emergency sump or the plant. No new systems are installed or removed as part of the proposed change. The containment emergency sump is a passive component and cannot initiate a malfunction or accident. No new credible accident is created that is not encompassed by the existing accident analyses that assume the function of the containment emergency sump.

The proposed change clarifies the Safety Function Determination Program when a supported system is made inoperable by the inoperability of a single Technical Specification support system. The Safety Function Determination Program directs the appropriate use of TS actions and the proposed change does not alter the current intent of the TS. The proposed change to the Safety Function Determination Program will not result in any change to the design or design function of the containment sump or a method of operation of the plant.

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

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

Response: No.

The proposed change adds a new specification to the TS for the containment emergency sump. An existing SR on the containment emergency sump is moved to the new specification and a duplicative requirement to perform the SR in TS 3.5.3 is removed. The new specification retains the existing requirements on the containment emergency sump and the actions to be taken when the containment emergency

sump is inoperable with the exception of adding new actions to be taken when the containment emergency sump is inoperable due to containment accident generated and transported debris exceeding the analyzed limits. The new action provides time to evaluate and correct the condition instead of requiring an immediate plant shutdown.

The proposed change does not affect the controlling values of parameters used to avoid exceeding regulatory or licensing limits. No Safety Limits are affected by the proposed change. The proposed change does not affect any assumptions in the accident analyses that demonstrate compliance with regulatory and licensing requirements.

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

Based on the above, Exelon concludes 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.

3.2 Conclusion

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.

4.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a 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 amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

5.0 REFERENCES

1. Final Traveler SE of TSTF 567, Revision 1, "Add Containment Sump TS to Address GSI-191 Issues," dated July 3, 2018 (ML18116A606)

ATTACHMENT 2

Markup of Technical Specifications Pages

Calvert Cliffs Nuclear Power Station, Units 1 and 2

Renewed Facility Operating License Nos. DPR-53 and DPR-69

Units 1 and 2 TS Pages

3.5.2-3
3.5.3-2
3.6.9-1
3.6.9-2
3.6.9-3
5.5-16

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.5	Verify each ECCS automatic valve that is not locked, sealed, or otherwise secured in position, in the flow path actuates to the correct position on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.6	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.7	Verify each low pressure safety injection pump stops on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.8	Deleted. ~~Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet strainers show no evidence of structural distress or abnormal corrosion.~~	~~In accordance with the Surveillance Frequency Control Program~~
SR 3.5.2.9	Verify the Shutdown Cooling System open-permissive interlock prevents the Shutdown Cooling System suction isolation valves from being opened with a simulated or actual Reactor Coolant System pressure signal of ≥ 309 psia.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.3.1	The HPSI train related portions of the train following Surveillance Requirements are applicable: SR 3.5.2.1 SR 3.5.2.5 SR 3.5.2.10 SR 3.5.2.2 SR 3.5.2.6 SR 3.5.2.3 ~~SR 3.5.2.8~~	In accordance with applicable Surveillance Requirements

3.6 CONTAINMENT SYSTEMS

3.6.9 Containment Emergency Sump

LCO 3.6.9 The Containment emergency sump shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment emergency sump inoperable due to containment accident generated and transported debris exceeding the analyzed limits.	A.1 Initiate action to mitigate containment accident generated and transported debris.	Immediately
	AND	
	A.2 Perform SR 3.4.13.1.	Once per 24 hours
	AND	
	A.3 Restore the containment emergency sump to OPERABLE status.	90 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Containment emergency sump inoperable for reasons other than Condition A.	B.1 -----NOTES------- 1. Enter applicable Conditions and Required Actions of LCO 3.5.2, "ECCS - Operating," and LCO 3.5.3, "ECCS - Shutdown," for emergency core cooling trains made inoperable by the containment emergency sump. 2. Enter applicable Conditions and Required Actions of LCO 3.6.6, "Containment Spray and Cooling Systems," for containment spray trains made inoperable by the containment emergency sump. ---------- Restore the containment emergency sump to OPERABLE status.	72 hours <u>OR</u> In accordance with the Risk Informed Completion Time Program
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. <u>AND</u> C.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.9.1	Verify, by visual inspection, the containment emergency sump does not show structural damage, abnormal corrosion, or debris blockage.	In accordance with the Surveillance Frequency Control Program

5.5 Programs and Manuals

A loss of safety function exists when, assuming no concurrent single failure, a safety function assumed in the accident analysis cannot be performed. For the purpose of this program, a loss of safety function may exist when a support system is inoperable, and:

a. A required system redundant to system(s) supported by the inoperable support system is also inoperable; or

b. A required system redundant to system(s) in turn supported by the inoperable supported system is also inoperable; or

c. A required system redundant to support system(s) for the supported systems (a) and (b) above is also inoperable.

The SFDP identifies where a loss of safety function exists. If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered. When a loss of safety function is caused by the inoperability of a single Technical Specification support system, the appropriate Conditions and Required Actions to enter are those of the support system.

5.5.16 Containment Leakage Rate Testing Program

A program shall be established to implement the leakage testing of the containment as required by 10 CFR 50.54(o) and 10 CFR Part 50, Appendix J, Option B. This program shall be in accordance with the guidelines contained in Nuclear Energy Institute (NEI) 94-01, “Industry Guideline for Implementing Performance Based Option of 10 CFR Part 50, Appendix J,” Revision 3-A, dated July 2012, and the conditions and limitations specified in NEI 94-01, Revision 2-A dated October 2008.

The peak calculated containment internal pressure for the design basis loss-of-coolant accident, P_a, is 49.7 psig. The containment design pressure is 50 psig.

ATTACHMENT 3

Markup of Technical Specifications Bases Pages (For Information Only)

Calvert Cliffs Nuclear Power Station, Units 1 and 2

Renewed Facility Operating License Nos. DPR-53 and DPR-69

Revised Technical Specifications Bases Pages

Units 1 and 2 TS Bases Pages

B 3.5.2-2
B 3.5.2-8
B 3.5.3-1
B 3.6.9-1
B 3.6.9-2
B 3.6.9-3
B 3.6.9-4
B 3.6.9-5
B 3.6.9-6
B 3.6.9-7

BASES

For LOCAs that are too small to initially depressurize the RCS below the shutoff head of the HPSI pumps, the steam generators must provide the core cooling function.

During low temperature conditions in the RCS, limitations are placed on the maximum number of HPSI pumps that may be OPERABLE. Refer to LCO 3.4.12 Bases, for the basis of these requirements.

During a large break LOCA, RCS pressure will decrease to < 200 psia in < 20 seconds. The safety injection systems are actuated upon receipt of a SIAS. If offsite power is available, the safeguard loads start immediately. If offsite power is not available, the engineered safety feature (ESF) buses shed normal operating loads and are connected to the diesel generators. Safeguard loads are then actuated in the programmed time sequence. The time delay associated with diesel starting, sequenced loading, and pump starting determines the time required before pumped flow is available to the core following a LOCA.

The active ECCS components, along with the passive SITs the ~~and~~ RWT, and the containment emergency sump, covered in LCO 3.5.1, ~~and~~ LCO 3.5.4, and LCO 3.6.9, provide the cooling water necessary to meet Reference 1, Appendix 1C, Criterion 44.

APPLICABLE SAFETY ANALYSES

The LCO helps to ensure that the following acceptance criteria, established by Reference 2 for ECCSs, will be met following a LOCA:

a. Maximum fuel element cladding temperature is ≤ 2200°F;

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation;

c. Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount generated if all of the metal in the cladding cylinders surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react;

d. Core is maintained in a coolable geometry; and

e. Adequate long-term core cooling capability is maintained.

Society of Mechanical Engineers Code. American Society of Mechanical Engineers Code provides the activities and Frequencies necessary to satisfy the requirements.

SR 3.5.2.4

The Surveillance Requirement was deleted in Amendment Nos. 260/237.

SR 3.5.2.5, SR 3.5.2.6, and SR 3.5.2.7

These SRs demonstrate that each automatic ECCS valve actuates to the required position on an actual, or simulated SIAS, and on a recirculation actuation signal; that each ECCS pump starts on receipt of an actual or simulated SIAS; and that the LPSI pumps stop on receipt of an actual or simulated recirculation actuation signal. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. In order to assure the results of the low temperature overpressure protection analysis remain bounding, whenever flow testing into the RCS is required at RCS temperatures ≤ 365°F (Unit 1), ≤ 301°F (Unit 2), the HPSI pump shall recirculate RCS water (suction from the RWT isolated) or the requirements of LCO 3.4.12, shall be satisfied. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The actuation logic is tested as part of the Engineered Safety Feature Actuation System testing, and equipment performance is monitored as part of the INSERVICE TESTING PROGRAM.

SR 3.5.2.8

The Surveillance Requirement was deleted in Amendment Nos. _____. ~~Periodic inspection of the containment sump ensures that it is unrestricted and stays in proper operating condition. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.~~

SR 3.5.2.9

Verifying that the SDC System open-permissive interlock is OPERABLE ensures that the SDC suction isolation valves are prevented from being remotely opened when RCS pressure, is at or above, the SDC System design suction pressure of 350 psia. The suction piping of the LPSI pumps, is the SDC

B 3.5 EMERGENCY CORE COOLING SYSTEM (ECCS)

B 3.5.3 ECCS - Shutdown

BASES

BACKGROUND

The Background Section for B 3.5.2, is applicable to these Bases, with the following modification.

In MODE 3 with pressurizer pressure < 1750 psia and in MODE 4, an ECCS train is defined as one HPSI subsystem. The HPSI flow path consists of piping, valves, and pumps that enable water from the RWT and the containment emergency sump to be injected into the RCS following the accidents described in B 3.5.2.

APPLICABLE SAFETY ANALYSES

The Applicable Safety Analyses section of B 3.5.2 is applicable to these Bases.

Due to the stable conditions associated with operation in MODE 3 with RCS pressure < 1750 psia and MODE 4, and the reduced probability of a DBA, the ECCS operational requirements are reduced. Included in these reductions is that certain automatic SIASs are not available. In this MODE, sufficient time exists for manual actuation of the required ECCS to mitigate the consequences of a DBA.

Only one train of ECCS is required for MODE 3 with RCS pressure < 1750 psia and MODE 4. Protection against single failures is not relied on for this MODE of operation.

Emergency Core Cooling System - Shutdown satisfies 10 CFR 50.36(c)(2)(ii), Criterion 3.

LCO

In MODE 3 with pressurizer pressure < 1750 psia and MODE 4, an ECCS subsystem is composed of a single HPSI subsystem. Each HPSI subsystem includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWT and transferring suction to the containment sump.

During an event requiring ECCS actuation, a flow path is required to supply water from the RWT to the RCS via the HPSI pumps and their respective supply headers to each of the four cold leg injection nozzles. In the long-term, this flow path will be switched to take its supply from the

B 3.6 CONTAINMENT SYSTEMS

B 3.6.9 Containment Emergency Sump

Bases

BACKGROUND

A Containment Emergency Sump is provided to support Design Basis Events that require ECCS recirculation to support long-term core cooling and decay heat removal. The Containment Emergency Sump consists of strainer modules, strainer ducting, and a sump pit. The strainer modules provide6,060 ft^2 of filtration surface area (nominal) amongst 33 strainer modules that are divided among 3 strainer rows. The strainer rows tie into a common radial duct which directs recirculation flow to the sump pit where the entrance to the ECCS Recirculation Headers is located.

During Design Basis Events the Containment Emergency Sump filters debris from the sump pool water prior to entering the ECCS recirculation headers. The debris filtration provided must be sufficient to ensure that decay heat removal from the reactor core is not adversely impacted, and that ECCS piping components do not become clogged, or suffer unacceptable wear.

The Containment Emergency Sump supplies both trains of the Emergency Core Cooling System (ECCS) and the Containment Spray System (CSS) during the recirculation mode of operation which is initiated on low Refueling Water Tank (RWT) level. The use of a single Containment Emergency Sump to supply both trains of the ECCS and CSS is acceptable since the containment emergency sump is a passive component, and passive failures are not required to be assumed to occur coincident with Design Basis Events.

Debris accumulation on the Containment Emergency Sump's strainer filtration surface area can lead to increased hydraulic friction losses which in turn can result in undesirable effects including deaeration of the fluid, reduced net positive suction

Bases

head (NPSH) at pump suction, strainer structural damage, and air ingestion via vortexing. Therefore, material sources inside containment that could become strainer debris during a Design Basis Event are strictly controlled. Potential strainer debris sources include, but are not limited to insulation, coatings, aluminum, tags and labels, fire barrier materials, and general area dirt and dust.

Included in the Containment Emergency Sump design basis are the refueling cavity drains and accompanying trash rack strainers. These items allow containment spray flow which falls in the refueling pool to drain into the containment basement. This increases the sump pool water level and improves strainer performance. The trash rack strainers over the cavity drains are credited with preventing large debris from clogging the cavity drains.

APPLICABLE SAFETY ANALYSES

LOCA is the only Design Bases Event that requires recirculation from the Containment Emergency Sump. In the LOCA analysis is assumed that the containment emergency sump is OPERABLE so that long-term operation of the Safety Injection and Containment Spray Systems can be maintained. As such, it supports emergency core cooling and containment cooling during an accident. It also provides a source of negative reactivity (Ref. 2). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of B 3.5.2, "ECCS - Operating," B 3.5.3, "ECCS - Shutdown," and B 3.6.6, "Containment Spray and Cooling Systems."

UFSAR Section 14.17 (Ref. 2) describes evaluations that confirm long-term core cooling is assured following any accident that requires recirculation from the containment emergency sump.

The containment emergency sump satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

Bases

LCO

The Containment Emergency Sump is required to ensure successful recirculation operation to support ECCS and Containment Spray System OPERABILITY. A Containment Emergency Sump consists of the containment drainage flow paths, the Containment Emergency Sump strainer filtration surface area, internal strainer ducting, and a sump pit containing the inlet to the ECCS and CSS piping. An OPERABLE Containment Emergency Sump has no structural damage or abnormal corrosion that could prevent recirculation of coolant, or allow oversized debris to enter the recirculation headers. Also, during a postulated design basis event an OPERABLE Containment Emergency Sump will not accumulate more debris on the filtration surface beyond that analyzed as being acceptable, and will limit fiber that passes through the strainer filtration surface area to less than 15 grams per fuel assembly.

Debris that might transport to the Containment Emergency Sump consists of the following (Ref. 1):

a. Accident generated debris sources - Insulation, coatings, and other materials which are damaged by the high energy line break (HELB) and transported to the Containment Emergency Sump. This includes materials within the HELB zone of influence and other materials (e.g., unqualified coatings) that fail due to the post-accident containment environment following the accident;

b) Latent debris sources – Pre-existing dirt, dust, paint chips, fines or shards of insulation, and other materials inside containment that are washed to the sump pool by the Containment Spray flow; and Chemical product debris sources – Aluminum and non-metallic materials such as paints, thermal insulation, and concrete that are susceptible to chemical reactions within the post-accident containment environment leading to corrosion products that are generated within the containment sump pool or are generated within containment and transported to the containment emergency sump.

Bases

Containment debris limits are defined in UFSAR Section 6.3 (Ref. 3).

APPLICABILITY

In MODEs 1, 2, 3, and 4, Containment Emergency Sump OPERABILITY requirements are dictated by the ECCS and containment spray OPERABILITY requirements. Containment spray has no OPERABILITY requirements in MODEs 3 with RCS pressure < 1750 psia, and MODE 4.

In MODEs 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Thus, the Containment Emergency Sump is not required to be OPERABLE in MODES 5 or 6.

ACTIONS

A.1, A.2, and A.3

Condition A is applicable when there is a condition which could result in containment accident generated and transported debris exceeding the analyzed limits. Containment debris limits are defined in Reference 3.

Immediate action must be initiated to mitigate the condition. Examples of mitigating actions are:

- Removing the debris source from containment or preventing the debris from being transported to the Containment Emergency Sump;
- Evaluating the debris source against the assumptions in the analysis;
- Deferring maintenance that would affect availability of the affected systems and other LOCA mitigating equipment;
- Deferring maintenance that would affect availability of primary defense-in-depth systems, such as containment coolers;

- Briefing operators on LOCA debris management actions; or

- Applying an alternative method to establish new limits.

While in this condition, the RCS water inventory balance, SR 3.4.13.1, must be performed at an increased Frequency of once per 24 hours. An unexpected increase in RCS leakage could be indicative of an increased potential for an RCS pipe break, which could result in debris being generated and transported to the Containment Emergency Sump. The more frequent monitoring allows operators to proactively minimize the potential for an RCS pipe break while the Containment Emergency Sump is inoperable.

The inoperable Containment Emergency Sump must be restored to OPERABLE status in 90 days. A 90-day Completion Time is reasonable for emergent conditions that involve debris in excess of the analyzed limits that could be generated and transported to the Containment Emergency Sump under accident conditions. The likelihood of an initiating event in the 90-day Completion Time is very small and there is margin in the associated analyses. The mitigating actions of Required Action A.1 provide additional assurance that the effects of debris in excess of the analyzed limits will be mitigated during the Completion Time.

B.1

When the Containment Emergency Sump is inoperable for reasons other than Condition A, such as blockage, structural damage, or abnormal corrosion that could prevent recirculation of coolant, it must be restored to OPERABLE status within 72 hours. The 72-hour Completion Time takes into account the reasonable time for repairs, and low probability of an accident that requires the Containment Emergency Sump occurring during this period. Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.

Bases

Required Action B.1 is modified by two Notes. The first Note indicates that the applicable Conditions and Required Actions of LCO 3.5.2, "ECCS - Operating," and LCO 3.5.3, "ECCS - Shutdown," should be entered if an inoperable Containment Emergency Sump results in an inoperable ECCS train. The second Note indicates that the applicable Conditions and Required Actions of LCO 3.6.6, "Containment Spray and Cooling Systems," should be entered if an inoperable Containment Emergency Sump results in an inoperable CSS train. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components.

C.1 and C.2

If the Containment Emergency Sump cannot be restored to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.9.1

Periodic inspections are performed to verify the Containment Emergency Sump does not show current or potential debris blockage, structural damage, abnormal corrosion, or contain openings larger than those specified in the design. This is to ensure the operability and structural integrity of the Containment Emergency Sump strainer, and associated structures as well as the operability of the ECCS and Containment Spray systems (Ref. 4).

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

REFERENCES

1. Regulatory Guide 1.82, Revision 4, “Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident,” March 2012.

2. UFSAR Chapter 14.17 (“Loss-of-Coolant Accident”).

3. UFSAR Section 6.3 (“Safety Injection”).

4. STP M-661-1(2), “Containment Emergency Sump Inspection.”