10 CFR 50.90

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102-08349-CDH/KJG
February 22, 2022

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

Subject: **Palo Verde Nuclear Generating Station Units 1, 2, and 3**
Docket Nos. STN 50-528, 50-529, and 50-530
Renewed Operating License Number NPF-41, NPF-51, and NPF-74
Application to Revise Technical Specifications to Adopt TSTF-567, *Add Containment Sump TS to Address GSI-191 Issues*

Pursuant to 10 CFR 50.90, Arizona Public Service Company (APS) is submitting a request for an amendment to the Technical Specifications (TS) for the Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3. APS requests adoption of TSTF-567, *Add Containment Sump TS to Address GSI-191 Issues,* which is an approved change to the Improved Standard Technical Specifications, into the PVNGS Units 1, 2, and 3 TS.

The proposed amendment adds a new TS 3.6.7, *Containment Sump,* and adds an Action to address the condition of the containment sump made inoperable due to containment accident generated and transported debris exceeding the analyzed limits. The Action provides time to correct or evaluate the condition in lieu of an immediate plant shutdown.

The enclosure provides a description and assessment of the proposed changes. Attachment 1 of the enclosure provides the existing TS pages marked to show the proposed changes. Attachment 2 of the enclosure provides revised (re-typed) TS pages. Attachment 3 of the enclosure provides existing TS Bases pages marked to show the proposed changes for information only.

Approval of the proposed amendment is requested by November 4, 2022. Once approved, the amendment shall be implemented within 120 days.

PVNGS has determined that there are no significant hazards considerations associated with the proposed change and that the TS change qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9).

In accordance with the PVNGS Quality Assurance Program, the Plant Review Board has reviewed and approved the license amendment request (LAR). By copy of this letter, the LAR is being forwarded to the Arizona Department of Health Services – Bureau of Radiation Control in accordance with 10 CFR 50.91(b)(1).

No new commitments are being made to the NRC by this letter.

Should you need further information regarding this letter, please contact Matthew S. Cox, Licensing Section Leader, at (623) 393-5753.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: February 22, 2022
(Date)

Sincerely,

CDH/KJG/mg

Enclosure: Application to Revise Technical Specifications to Adopt TSTF-567, *Add Containment Sump TS to Address GSI-191 Issues*

cc:

S. A. Morris	NRC Region IV Regional Administrator
S. P. Lingam	NRC NRR Project Manager for PVNGS
L. N. Merker	NRC Senior Resident Inspector for PVNGS
B. Goretzki	Arizona Department of Health Services – Bureau of Radiation Control

Enclosure

Application to Revise Technical Specifications to Adopt TSTF-567, *Add Containment Sump TS to Address GSI-191 Issues*

1.0 DESCRIPTION

Arizona Public Service Company (APS) requests adoption of TSTF-567, *Add Containment Sump TS to Address GSI-191 Issues,* which is an approved change to the Improved Standard Technical Specifications (ISTS) into the Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3 Technical Specifications (TS).

The proposed amendment adds a new TS 3.6.7, *Containment Sump,* and adds an Action to address the condition of the containment sump made inoperable due to containment accident generated and transported debris exceeding the 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 sump that otherwise retains the existing Technical Specifications requirements. An existing Surveillance Requirement (SR) is moved from TS 3.5.3 to the new specification. The requirement to perform the SR in TS 3.5.4 is deleted.

2.0 ASSESSMENT

2.1 Applicability of Safety Evaluation

APS has reviewed the safety evaluation for TSTF-567 provided to the Technical Specifications Task Force in a letter dated July 3, 2018 [NRC Agencywide Documents Access and Management System (ADAMS) Accession No. ML18109A077]. This review included the NRC staff's evaluation, as well as the information provided in TSTF-567. APS has concluded that the justifications presented in TSTF-567 and the safety evaluation prepared by the NRC staff are applicable to PVNGS Units 1, 2, and 3 and justify this amendment for the incorporation of the changes to the PVNGS TS.

2.2 Variations

APS is not proposing any variations from the TS changes described in the TSTF-567 or the applicable parts of the NRC staff's safety evaluation. Note that the optional change to TS 5.5.15 that is described in TSTF-567 is not necessary because the PVNGS TS 5.5.15 already includes the recommended statement. Also, the proposed change to TS Bases B 3.5.3, *ECCS – Shutdown* (PVNGS Technical Specification Bases B 3.5.4, *ECCS – Shutdown*) is not necessary because the existing PVNGS TS Bases B 3.5.4 Background section already describes the containment sump as the pump suction source during recirculation.

APS is proposing minor variations from the TS Bases changes described in the TSTF-567 as follows:

- For TS Bases B 3.6.7, TSTF-567 includes the following statement under ACTIONS A.1, A.2, and A.3 relative to the 90-day completion time: "The likelihood of an initiating event in the 90-day Completion Time is very small and there is margin in the associated analyses." In lieu of this, the following wording is proposed to align with the wording in the NRC Safety Evaluation for TSTF-567: "Ninety days is adequate given the conservatisms in the containment debris analysis and the proposed compensatory actions required to be implemented immediately by Required Action A.1."

- Slightly different wording for TS Bases B 3.6.13, *Containment Sump* (new PVNGS TS Bases B 3.6.7, *Containment Sump*) is proposed to further define for the operators what are the analyzed sump debris limits, which, if exceeded, required entry into Condition A of the Limiting Condition for Operation (LCO); and the strainer design limits, which are provided in the Updated Final Safety Analysis Report (UFSAR) and Study 13-MS-C043, which is referenced in the proposed TS Bases.

- In the description of the containment sump in the new TS Bases B 3.6.13, *Containment Sump* (new PVNGS TS Bases B 3.6.7, *Containment Sump*), the words "the pump suction trash racks" have been replaced with "the pump suction vortex breaker" to reflect the PVNGS design.

The PVNGS TS utilize different numbering and titles than the ISTS on which TSTF-567 was based. Specifically, the PVNGS TS for *ECCS – Operating,* is LCO 3.5.3, and the associated sump inspection is SR 3.5.3.8, whereas the number used in TSTF-567 for *ECCS – Operating,* is LCO 3.5.2 and the associated sump inspection surveillance requirement is SR 3.5.2.10. Also, the PVNGS TS for *ECCS – Shutdown*, is LCO 3.5.4, whereas the number used in TSTF-457 for *ECCS – Shutdown*, is LCO 3.5.3. Further, the PVNGS TS for *Containment Sump* (new) is LCO 3.6.7, whereas the number used in TSTF-567 for *Containment Sump* (new) is LCO 3.6.13. Finally, the PVNGS TS SR for the Reactor Coolant System (RCS) water inventory balance surveillance is SR 3.4.14.1, whereas the number used in TSTF-567 is 3.4.13.1. These differences are administrative and do not affect the applicability of TSTF-567 to the PVNGS TS.

The PVNGS TSs contain a Surveillance Frequency Control Program. Therefore, the Frequency for SR 3.6.7 is "In accordance with the Surveillance Frequency Control Program."

The NRC approved Risk-Informed Extended Completion Times and a Risk Informed Completion Time program into the PVNGS TS on May 29, 2019 (see NRC ADAMS Accession No. ML19085A525). Despite this approval of the use of Risk Informed Completion Times for selected LCOs, APS is not requesting that proposed LCO 3.6.7, Required Action B.1, have an alternative Completion Time of "In accordance with the Risk Informed Completion Time Program."

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Consideration Analysis

The proposed amendment adds a new Technical Specification (TS) 3.6.7, *Containment Sump,* and adds an Action to address the condition of the containment sump made inoperable due to containment accident generated and transported debris exceeding the 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 sump that otherwise retains the existing Technical Specifications requirements. An existing Surveillance Requirement (SR) is moved from TS 3.5.3 to the new specification. The requirement to perform the SR in TS 3.5.4 is deleted.

Arizona Public Service Company (APS) has evaluated whether a significant hazards consideration is involved with the proposed change 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 sump. An existing SR on the containment sump is moved to the new specification and a duplicative requirement to perform the SR in TS 3.5.4 is removed. The new specification retains the existing requirements on the containment sump and the actions to be taken when the containment sumps are inoperable with the exception of adding new actions to be taken when the containment sumps are 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 sump is not an initiator of any accident previously evaluated. The containment 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 sumps are 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 sump and the capability of the containment sump assumed in the accident analysis is not changed. The proposed action requires implementation of mitigating actions while the containment sumps are inoperable and more frequent monitoring of reactor coolant leakage to detect any increased potential for an accident that would require the containment sump. The consequences of an accident during the proposed action are no different than the current consequences of an accident if the containment sumps are inoperable.

   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 sump. An existing SR on the containment sump is moved to the new specification and a duplicative requirement to perform the SR in TS 3.5.4 is removed. The new specification retains the existing requirements on the containment sump and the actions to be taken when the containment sumps are inoperable with the exception of adding new actions to be taken when the containment sumps are 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 sump or the plant. No new systems are installed or removed as part of the proposed change. The containment 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 sump.

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 sump. An existing SR on the containment sump is moved to the new specification and a duplicative requirement to perform the SR in TS 3.5.4 is removed. The new specification retains the existing requirements on the containment sump and the actions to be taken when the containment sumps are inoperable with the exception of adding new actions to be taken when the containment sumps are 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, APS 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.

ATTACHMENT 1:

Proposed Technical Specification Changes (Mark-Up)

Changed Page(s)

Table of Contents Page iii
3.5.3-3
3.5.4-1

3.6.7-1
3.6.7-2
3.6.7-3

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.3.7	Verify, for each ECCS throttle valve listed below, each position stop is in the correct position. LPSI System Valve Number: SIB-UV 615, SIB-UV 625, SIA-UV 635, SIA-UV 645, SIA-HV 306, SIB-HV 307 Hot Leg Injection Valve Numbers: SIC-HV 321, SID-HV 331	In accordance with the Surveillance Frequency Control Program
~~SR 3.5.3.8~~	~~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~~

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.4 ECCS - Shutdown

LCO 3.5.4 One High Pressure Safety Injection (HPSI) train shall be OPERABLE.

APPLICABILITY: MODE 3 with pressurizer pressure < 1837 psia and with RCS T_c < 485°F.
MODE 4.

ACTIONS

----------NOTE----------
LCO 3.0.4.b is not applicable to ECCS High Pressure Safety Injection subsystem when entering MODE 4.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required HPSI train inoperable.	A.1 Restore required HPSI train to OPERABLE status.	1 hour
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 5.	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.4.1	The following SRs are applicable: SR 3.5.3.1 SR 3.5.3.2 SR 3.5.3.3 SR 3.5.3.4 SR 3.5.3.5 SR 3.5.3.7 ~~SR 3.5.3.8~~	In accordance with applicable SRs

3.6 CONTAINMENT SYSTEMS

3.6.7 Containment Sump

LCO 3.6.7 Two containment sumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, AND 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more containment sumps 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. AND	Immediately
	A.2 Perform SR 3.4.14.1. AND	Once per 24 hours
	A.3 Restore the containment sumps to OPERABLE status.	90 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more containment sumps inoperable for reasons other than Condition A.	B.1 ----------NOTES---------- 1. Enter applicable Conditions and Required Actions of LCO 3.5.3, "ECCS – Operating," and LCO 3.5.4, "ECCS – Shutdown," for emergency core cooling trains made inoperable by the containment sumps. 2. Enter applicable Conditions and Required Actions of LCO 3.6.6, "Containment Spray System," for containment spray trains made inoperable by the containment sumps. ---------- Restore the containment sumps to OPERABLE status.	72 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.7.1	Verify, by visual inspection, the containment sumps do not show structural damage, abnormal corrosion, or debris blockage.	In accordance with the Surveillance Frequency Control Program

ATTACHMENT 2:

Proposed Technical Specification Changes (Re-Typed)

Changed Page(s)

Table of Contents Page iii
3.5.3-3
3.5.4-1

3.6.7-1
3.6.7-2
3.6.7-3

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.3.7	Verify, for each ECCS throttle valve listed below, each position stop is in the correct position. LPSI System Valve Number: SIB-UV 615, SIB-UV 625, SIA-UV 635, SIA-UV 645, SIA-HV 306, SIB-HV 307 Hot Leg Injection Valve Numbers: SIC-HV 321, SID-HV 331	In accordance with the Surveillance Frequency Control Program

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.4 ECCS - Shutdown

LCO 3.5.4 One High Pressure Safety Injection (HPSI) train shall be OPERABLE.

APPLICABILITY: MODE 3 with pressurizer pressure < 1837 psia and with RCS T_c < 485°F.
MODE 4.

ACTIONS

----------NOTE----------
LCO 3.0.4.b is not applicable to ECCS High Pressure Safety Injection subsystem when entering MODE 4.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required HPSI train inoperable.	A.1 Restore required HPSI train to OPERABLE status.	1 hour
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 5.	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.4.1	The following SRs are applicable: SR 3.5.3.1 SR 3.5.3.2 SR 3.5.3.3 SR 3.5.3.4 SR 3.5.3.5 SR 3.5.3.7	In accordance with applicable SRs

3.6 CONTAINMENT SYSTEMS

3.6.7 Containment Sump

LCO 3.6.7 Two containment sumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, AND 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more containment sumps 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. AND	Immediately
	A.2 Perform SR 3.4.14.1. AND	Once per 24 hours
	A.3 Restore the containment sumps to OPERABLE status.	90 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more containment sumps inoperable for reasons other than Condition A.	B.1 ----------NOTES---------- 1. Enter applicable Conditions and Required Actions of LCO 3.5.3, "ECCS – Operating," and LCO 3.5.4, "ECCS – Shutdown," for emergency core cooling trains made inoperable by the containment sumps. 2. Enter applicable Conditions and Required Actions of LCO 3.6.6, "Containment Spray System," for containment spray trains made inoperable by the containment sumps. ---------- Restore the containment sumps to OPERABLE status.	72 hours
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 3.6.7.1	Verify, by visual inspection, the containment sumps do not show structural damage, abnormal corrosion, or debris blockage.	In accordance with the Surveillance Frequency Control Program

ATTACHMENT 3:

Revised Technical Specification Bases Changes (Page Markups – For Information)

Changed Page

B 3.5.3-2
B 3.5.3-10

B 3.6.7-1
B 3.6.7-2
B 3.6.7-3
B 3.6.7-4
B 3.6.7-5

BASES

BACKGROUND (continued)

A suction header supplies water from the RWT or the containment sump to the ECCS pumps. Separate piping supplies each train. The discharge headers from each HPSI pump divide into four supply lines. Both HPSI trains feed into each of the four injection lines. The discharge header from each LPSI pump divides into two supply lines, each feeding the injection line to two RCS cold legs. Control valves or orifices are set to balance the flow to the RCS. This flow balance directs sufficient flow to the core to meet the analysis assumptions following a LOCA in one of the RCS cold legs.

The Safety Injection (SI) systems are actuated upon receipt of an SIAS. The actuation of safeguard loads is accomplished in a programmed time sequence. If offsite power is available, the safeguard loads start immediately in the programmed sequence. If offsite power is not available, the Engineered Safety Feature (ESF) buses shed normal operating loads and are connected to the Diesel Generators (DGs). 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 Safety Injection Tanks (SITs), ~~and~~ the RWT, and the containment sumps, covered in LCO 3.5.1, "Safety Injection Tanks (SITs)-Operating"; LCO 3.5.2, "SITs-Shutdown"; ~~and~~ LCO 3.5.5, "Refueling Water Tank (RWT)," and LCO 3.6.7, “Containment Sump,” provide the cooling water necessary to meet GDC 35 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The LCO helps to ensure that the following acceptance criteria, established by 10 CFR 50.46 (Ref. 2) for ECCSs, will be met following a LOCA:

a. Maximum fuel element cladding temperature is $\leq$ 2200°F;

b. Maximum cladding oxidation is $\leq$ 0.17 times the total cladding thickness before oxidation;

c. Maximum hydrogen generation from a zirconium water reaction is $\leq$ 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;

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.3.7 (continued)

minimum flow. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. These valves are also monitored in accordance with the requirements of 10 CFR 50.65 (Ref. 5).

~~SR 3.5.3.8~~

~~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.~~

REFERENCES

1. 10 CFR 50, Appendix A, GDC 35.
2. 10 CFR 50.46.
3. UFSAR, Chapter 6.
4. NRC Memorandum to V. Stello, Jr., from R. L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.
5. 10 CFR 50.65.
6. Combustion Engineering Owners Group Joint Applications Report for Low Pressure Safety Injection System AOT Extension, CE NPSD-995, dated May 1995, as submitted to NRC in APS letter no. 102-03392, dated June 13, 1995, with updates described in letter no. 102-04250 dated February 26, 1999. Also see TS amendment no. 124 dated February 1, 2000.
7. ASME Code for Operation and Maintenance of Nuclear Power Plants.

B 3.6 CONTAINMENT SYSTEMS

B 3.6.7 Containment Sump

BASES

BACKGROUND

The containment sumps provide a borated water source to support recirculation of coolant from the containment sump for residual heat removal, emergency core cooling, containment cooling, and containment atmosphere cleanup during accident conditions.

The containment sumps supply both trains of the Emergency Core Cooling System (ECCS) and the Containment Spray System (CSS) during any accident that requires recirculation of coolant from the containment sumps. The recirculation mode is initiated when the pump suction is transferred to the containment sumps on low Refueling Water Tank (RWT) level, which ensures the containment sumps have enough water to supply the net positive suction head to the ECCS and CSS pumps. There are two containment sumps, and each supplies a single train of the ECCS and CSS.

The containment sumps contain strainers to limit the quantity of the debris materials from entering the sump suction piping. Debris accumulation on the strainers can lead to undesirable hydraulic effects including air ingestion through vortexing or deaeration, and reduced net positive suction head (NPSH) at pump suction piping.

While the majority of debris accumulates on the strainers, some fraction penetrates the strainers and is transported to downstream components in the ECCS, CSS, and Reactor Coolant System (RCS). Debris that penetrates the strainer can result in wear to the downstream components, blockages, or reduced heat transfer across the fuel cladding. Excessive debris in the containment sump water source could result in insufficient recirculation of coolant during the accident, or insufficient heat removal from the core during the accident.

APPLICABLE SAFETY ANALYSIS

During all accidents that require recirculation, the containment sumps provide a source of borated water to the ECCS and CSS pumps. As such, it supports residual heat removal, emergency core cooling, containment cooling, and containment atmosphere cleanup during an accident. It also provides a source of negative reactivity (Ref. 1). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of B 3.5.3, “ECCS – Operating,” B 3.5.4, “ECCS – Shutdown,” and B 3.6.6, “Containment Spray System.”

UFSAR Section 6.2.2.2.1 (Ref. 2) describes evaluations that confirm long-term core cooling is assured following any accident that requires recirculation from the containment sump.

The containment sumps satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

(continued)

BASES

LCO

Two containment sumps are required to ensure a source of borated water to support ECCS and CSS OPERABILITY. A containment sump consists of the containment drainage flow paths, the containment sump strainers, the pump suction vortex breaker, and the inlet to the ECCS and CSS piping. An OPERABLE containment sump has no structural damage or abnormal corrosion that could prevent recirculation of coolant and will not be restricted by containment accident generated and transported debris.

Containment accident generated and transported debris consists of the following:

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 sumps. 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 do not have to be damaged by the HELB to be transported to the containment sumps; and

c. Chemical product debris sources – Aluminum, zinc, carbon steel, copper, 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 sump.

Containment sump design limits are defined in UFSAR Section 6.2.2.2.1 (Ref. 2). For the purposes of Condition A of this LCO, the containment sump analyzed limits are provided in Engineering Study 13-MS-C043 (Ref. 3).

APPLICABILITY

In MODES 1, 2, 3, and 4, containment sump OPERABILITY requirements are dictated by the ECCS and CSS OPERABILITY requirements. Since both the ECCS and the CSS must be OPERABLE in MODES 1, 2, 3, and 4, the containment sump must be OPERABLE to support their operation.

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 sump are not required to be OPERABLE in MODES 5 or 6.

(continued)

BASES

ACTIONS

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

Condition A is applicable when there is a condition which results in containment accident generated and transported debris exceeding the analyzed limits as provided in Engineering Study 13-MS-C043 (Ref. 3). Containment sump design limits are defined in UFSAR Section 6.2.2.2.1 (Ref. 2).

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 sumps;
- 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 3.4.14.1, 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 sump. The more frequent monitoring allows operators to act in a timely fashion to minimize the potential for an RCS pipe break while the containment sumps are inoperable.

For the purposes of applying LCO 3.0.6 and the Safety Function Determination Program while in Condition A, the two containment sumps are considered a single support system for all ECCS and CSS trains because containment accident generated and transported debris issues that would render one sump inoperable would render all of the sumps inoperable.

The inoperable containment sumps 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 sump under accident conditions. Ninety days is adequate given the conservatisms in the containment debris analysis and the proposed compensatory actions required to be implemented immediately by Required Action A.1. 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.

(continued)

BASES

ACTIONS

B.1

When the containment sumps are 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 sump occurring during this period.

Required Action B.1 is modified by two Notes. The first Note indicates that the applicable Conditions and Required Actions of LCO 3.5.3, "ECCS – Operating," and LCO 3.5.4, "ECCS – Shutdown," should be entered in an inoperable containment 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 System," should be entered if an inoperable containment 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 sumps 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 to an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.7.1

Periodic inspections are performed to verify the containment sumps do not show current or potential debris blockage, structural damage, or abnormal corrosion to ensure the operability and structural integrity of the containment sumps (Ref. 1).

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

(continued)

BASES

REFERENCES

1. UFSAR, Chapter 6 and Chapter 15.

2. UFSAR, Section 6.2.2.2.1, “Containment Recirculation Sump Screens.”

3. Engineering Study 13-MS-C043.