Palo Verde Nuclear
Generating Station

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10 CFR 50.90

102-04607-CDM/SAB/RAS
September 11, 2001

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-37
Washington, DC 20555-0001

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Docket Nos. STN 50-528/529/530
Request for Amendment to Technical Specification 3.9.5,
Shutdown Cooling and Coolant Circulation – Low Water Level

Pursuant to 10 CFR 50.90, Arizona Public Service Company (APS) hereby requests an amendment to Technical Specification 3.9.5, Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level, for each Palo Verde Nuclear Generating Station (PVNGS) Unit. The proposed amendment, discussed in attachment 2 to this letter, would allow the non-operating SDC loop to be declared inoperable for a period up to 2 hours for surveillance testing in MODE 6. This change is based on the NRC approved Technical Specification Task Force (TSTF) Traveler Number 361, Revision 2. A copy of TSTF No. 361, Revision 2, is provided in attachment 6.

Based on the responses to the three standards provided for determining whether a significant hazard consideration exists as stated in 10 CFR 50.92, APS has concluded that the proposed amendment involves no significant hazards consideration.

In accordance with the PVNGS Quality Assurance Program, the Plant Review Board and Offsite Safety Review Committee have reviewed and concurred with this proposed amendment. By copy of this letter, this submittal is being forwarded to the Arizona Radiation Regulatory Agency (ARRA) pursuant to 10 CFR 50.91(b)(1).

APS requests approval of the proposed amendment by January 31, 2002 to support implementation prior to the tenth refueling outage of PVNGS Unit 2 scheduled for March 2002. An implementation time of 45 days is requested for this amendment.

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

A001

Should you have any questions, please contact Thomas N. Weber at (623) 393-5764.

Sincerely,

David D Mauldin

CDM/SAB/RKB/kg

Attachments:

1. Notarized Affidavit
2. License Amendment Request Analysis
3. Markup of Technical Specification Pages
4. Retyped Technical Specification Pages
5. Associated Changes to the Technical Specification Bases (for information only)
6. Technical Specification Task Force Traveler 361, Revision 2 (for information only)

cc: E. W. Merschoff [Region IV Administrator] (all w/Attachments)
L. R. Wharton [NRR Project Manager]
J. H. Moorman [Sr. Resident Inspector]
A. V. Godwin [ARRA]

Attachment 1

NOTARIZED AFFIDAVIT

AFFIDAVIT

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, David Mauldin, represent that I am Vice President, Nuclear Engineering and Support, Arizona Public Service Company (APS), that the foregoing document has been signed by me on behalf of APS with full authority to do so, and that to the best of my knowledge and belief, the statements made therein are true and correct.

David Mauldin

Sworn To Before Me This 11th Day Of September, 2001.

Notary Public

My Commission Expires

"OFFICIAL SEAL"
Nora E. Meador
Notary Public-Arizona
Maricopa County
My Commission Expires 4/6/2003

Attachment 2

LICENSE AMENDMENT REQUEST ANALYSIS

Technical Specification 3.9.5,
Shutdown Cooling and Coolant Circulation – Low Water Level

1.0 DESCRIPTION OF PROPOSED AMENDMENT

2.0 PURPOSE OF THE TECHNICAL SPECIFICATION

3.0 NEED FOR THE AMENDMENT

4.0 SAFETY ANALYSIS

5.0 NO SIGNIFICANT HAZARDS CONSIDERATION

6.0 ENVIRONMENTAL CONSIDERATION

7.0 PRECEDENT

1.0 DESCRIPTION OF THE PROPOSED AMENDMENT

The proposed amendment would add a note to the limiting condition for operation (LCO) of Technical Specification (TS) 3.9.5, Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level, that would permit one required SDC loop to be declared inoperable for a period of up to 2 hours for surveillance testing, provided the other SDC loop is OPERABLE and in operation. Technical Specification 3.9.5 is applicable in MODE 6 with water level less than 23 feet above the top of the reactor vessel flange. This change is based on the NRC approved Technical Specification Task Force (TSTF) Traveler Number 361, Revision 2.

In addition, the associated TS Bases will be revised to ensure that consideration is given to such factors as core time to boil, potential reactor coolant system draining evolutions, and the ability to inject borated water into the core, if needed. The Bases insert for the TSTF stated that "consideration should be given" and "consideration should include" as part of the text. During the PVNGS internal review process required by the PVNGS Quality Assurance Program, it was determined that this wording needed to be strengthened. Therefore, the text in the TSTF was changed to "consideration shall be given" and "consideration shall as a minimum include," respectively.

2.0 PURPOSE OF THE TECHNICAL SPECIFICATION

The purposes of the Shutdown Cooling System in MODE 6 are to remove decay heat and sensible heat from the reactor coolant system (RCS), to provide mixing of borated coolant, to provide sufficient coolant circulation, to minimize the effects of a boron dilution event, and to prevent boron stratification.

The current TS 3.9.5, Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level, requires two SDC loops to be OPERABLE, and one SDC loop to be in operation in MODE 6 with the water level less than 23 feet above the top of the reactor vessel flange. With one SDC loop inoperable, the TS requires immediate initiation of actions to restore the SDC loop to OPERABLE status, or initiate actions to increase the water level to greater than or equal to 23 feet above the top of the reactor vessel flange. When the water level is established at greater than or equal to 23 feet above the top of the reactor vessel flange, the Applicability changes to TS 3.9.4, Shutdown Cooling (SDC) and Coolant Circulation – High Water Level, which only requires one SDC loop to be OPERABLE and in operation.

In MODE 6, the operation of one SDC loop provides sufficient decay heat removal capability and prevents boron stratification in the core. In MODE 6, with the water level less than 23 feet above the top of the reactor vessel flange, the second SDC loop (standby) is required to be OPERABLE to ensure that a backup shutdown cooling loop can be placed in operation in the event that the operating SDC loop becomes inoperable. This requirement ensures that an additional SDC pump can be quickly

placed in operation, if necessary, to maintain decay heat removal and reactor coolant circulation.

3.0 NEED FOR THE AMENDMENT

The proposed amendment to TS 3.9.5, Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level, would allow one SDC loop to be inoperable for a period up to 2 hours for surveillance testing, provided the other SDC loop is OPERABLE and in operation when in MODE 6 with the water level less than 23 feet above the top of the reactor vessel flange. This proposed amendment would reduce the burden of scheduling surveillance tests that result in a SDC loop being made inoperable, in MODE 5, where scheduling flexibility is limited. The proposed amendment would permit the surveillance tests to be performed on the non-operating SDC loop during a time when these tests are safe and when the greatest scheduling flexibility exists.

This proposed amendment is consistent with notes that currently exist in TS 3.4.7, RCS Loops – MODE 5, Loops Filled, and TS 3.4.8, RCS Loops – MODE 5, Loops Not Filled. The existing notes in TS 3.4.7 and TS 3.4.8 are part of Palo Verde Nuclear Generating Station's (PVNGS) original licensing basis as documented in Combustion Engineering Safety Systems Analysis Report, Final Safety Analysis Report, Chapter 16, Technical Specifications, Amendment 9, February 27, 1984 (Ref. TS Nos. 3.4.1.4.1 and 3.4.1.4.2).

This change is based on the NRC approved Technical Specification Task Force Traveler Number 361, Revision 2.

4.0 SAFETY ANALYSIS

In MODE 6, Technical Specification (TS) 3.9.5 requires one shutdown cooling (SDC) loop to be OPERABLE and in operation to provide decay heat removal and adequate thermal and boron mixing of the reactor coolant system (RCS). The second SDC loop is required to be OPERABLE to provide backup capability to the operating SDC loop when the RCS water level is less than 23 feet above the top of the reactor vessel flange.

One SDC loop is sufficient to provide the necessary decay heat removal capability and to prevent boron stratification in the reactor core. The proposed amendment would only permit the non-operating SDC loop to be declared inoperable for a period of less than or equal to 2 hours. Prior to declaring the non-operating SDC loop inoperable using the proposed note, consideration shall be given to such factors as core time to boil, potential RCS draining operations that may further reduce RCS water level, and the capability to inject borated water into the core. This proposed change would permit surveillance tests that may render the non-operating SDC loop

inoperable to be performed during a time when these tests are safe and possible. Giving consideration to the core time to boil prior to declaring the non-operating SDC loop inoperable ensures that the duration of the proposed inoperability and the ability to return the system to service from the inoperable condition is assessed. Additionally, giving consideration to the current plant status (i.e., potential RCS draining operations that may coincide with the allowed inoperability and the ability to inject borated water into the core) prior to declaring the non-operating SDC loop inoperable ensures the ability to adequately maintain the core covered. In the unlikely event that the operating SDC loop becomes inoperable concurrent with the inoperability of the non-operating SDC loop allowed by the proposed note, adequate controls exist within the TS 3.9.5 Required Actions to ensure adequate decay heat removal. In addition, if the operating SDC loop becomes inoperable, operator action to restore the SDC loop being tested to OPERABLE status and place that SDC loop in operation will be timely such that adequate decay heat removal capability is restored.

This proposed amendment is consistent with notes that currently exist in TS 3.4.7, RCS Loops – MODE 5, Loops Filled, and TS 3.4.8, RCS Loops – MODE 5, Loops Not Filled. Additionally, this change is based on the NRC approved Technical Specification Task Force Traveler (TSTF) Number 361, Revision 2. SDC is not an accident initiator, but instead serves as a long-term accident mitigation system to maintain sufficient decay heat removal following an accident. This proposed amendment does not change, degrade, or prevent actions described or assumed in any accident. It will not alter any assumptions previously made in evaluating radiological consequences or affect any fission product barriers. It does not increase any challenges to safety systems. Therefore, this proposed amendment would not increase the probability of an accident or have any impact on the consequences of any accident described and evaluated in Chapter 6 or Chapter 15 of the PVNGS UFSAR.

5.0 NO SIGNIFICANT HAZARDS CONSIDERATION

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with a proposed amendment would not: (1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) Involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

Standard 1 -- Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

No. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed amendment would add a note to the limiting condition of operation (LCO) of Technical Specification 3.9.5, Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level, that would permit one required SDC loop to be declared inoperable for a period of up to 2 hours for surveillance testing, provided the other SDC loop is OPERABLE and in operation.

Allowing the non-operating SDC loop to be declared inoperable in accordance with the proposed amendment does not involve a significant increase in the probability of an accident previously evaluated because the SDC system is not an accident initiator of any previously evaluated accidents. Because the SDC system does not initiate any previously analyzed accidents, it cannot increase the probability of these accidents occurring.

Furthermore, allowing the non-operating SDC loop to be declared inoperable in accordance with the proposed amendment does not involve a significant increase in the consequences of an accident previously analyzed because only one operating SDC loop is necessary to perform the SDC system function of removing decay heat from the reactor core.

The proposed amendment does not represent a change to the design of the facility. Nor does the proposed amendment prevent the safety function of the shutdown cooling system from being performed. The proposed amendment does not alter, degrade, or prevent actions described or assumed in any accident described in the PVNGS Updated Final Safety Analysis Report (UFSAR) from being performed. Therefore, since the SDC system is not an accident initiator and because only one SDC loop is necessary to perform the design function, the proposed amendment would not significantly increase the probability or consequences of an accident previously evaluated.

Standard 2 -- Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

No. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed amendment would add a note to the limiting condition of operation (LCO) of Technical Specification 3.9.5, Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level, that would permit one required SDC loop to be declared inoperable for a period of up to 2 hours for surveillance testing, provided the other SDC loop is OPERABLE and in operation. Allowing the non-operating SDC loop to be declared inoperable in accordance with the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated because: 1) the proposed amendment does not represent a change to the design of the plant, 2) the proposed amendment does not involve the installation of new or different equipment, 3) the proposed amendment does not alter the methods for operating plant equipment, and 4) the proposed amendment does not affect any other safety related equipment. Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3 -- Does the proposed change involve a significant reduction in a margin of safety?

No. The proposed amendment does not involve a significant reduction in a margin of safety.

The proposed amendment would add a note to the limiting condition of operation (LCO) of Technical Specification (TS) 3.9.5, Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level, that would permit the non-operating SDC loop to be declared inoperable for a period of up to 2 hours for surveillance testing in MODE 6, when the water level is less than 23 feet above the top of the reactor vessel flange, provided the other SDC loop is OPERABLE and in operation. Allowing the non-operating SDC loop to be declared inoperable in accordance with the proposed amendment does not involve a significant reduction in a margin of safety because the operating SDC loop provides sufficient decay heat removal capacity. The proposed change does not impact the operating SDC loop. In the unlikely event that the operating SDC loop becomes inoperable concurrent with the inoperability of the non-operating SDC loop allowed by the proposed note, adequate controls exist within the TS 3.9.5 Required Actions to ensure adequate decay heat removal. In addition, if the operating SDC loop fails,

operator action to restore the SDC loop being tested to OPERABLE status and place that SDC loop in operation will be timely such that adequate decay heat removal capability is maintained. Therefore, the proposed amendment does not involve a significant reduction in a margin of safety.

Based on the responses to these three criteria, Arizona Public Service Company (APS) has concluded that the proposed amendment involves no significant hazard consideration.

6.0 ENVIRONMENTAL CONSIDERATION

APS has determined that the proposed amendment involves no changes in the amount or type of effluent that may be released offsite, and results in no increase in individual or cumulative occupational radiation exposure. As described above, the proposed TS amendment involves no significant hazards consideration and, as such, meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

7.0 PRECEDENT

1. This proposed amendment is consistent with notes that currently exist in TS 3.4.7, RCS Loops – MODE 5, Loops Filled, and TS 3.4.8, RCS Loops – MODE 5, Loops Not Filled. The existing notes in TS 3.4.7 and TS 3.4.8 are part of Palo Verde Nuclear Generating Station's original licensing basis and documented in Combustion Engineering Safety Systems Analysis Report, Final Safety Analysis Report, Chapter 16, Technical Specifications, Amendment 9, February 27, 1984. (Ref. STS Nos. 3.4.1.4.1 and 3.4.1.4.2).

2. This proposed amendment is based on the NRC approved Technical Specification Task Force (TSTF) Traveler Number 361, Revision 2.

Attachment 3

Marked-up Technical Specification Page

PVNGS UNITS 1, 2, and 3: Page 3.9.5-1

3.9 REFUELING OPERATIONS

3.9.5 Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level

LCO 3.9.5 Two SDC loops shall be OPERABLE, and one SDC loop shall be in operation.

NOTES

NOTE

1.

The required SDC loop may be removed from operation for ≤ 1 hour per 8 hour period, provided no operations are permitted that would cause reduction of the Reactor Coolant System boron concentration.

INSERT 3

APPLICABILITY: MODE 6 with the water level < 23 ft above the top of reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SDC loop inoperable.	A.1 Initiate action to restore SDC loop to OPERABLE status.	Immediately
	OR	
	A.2 Initiate action to establish ≥ 23 ft of water above the top of reactor vessel flange.	Immediately

Technical Specification 3.9.5 Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level

INSERT:

---------- NOTES----------

2. One required SDC loop may be inoperable for up to 2 hours for surveillance testing, provided the other SDC loop is OPERABLE and in operation.

Attachment 4

Retyped Technical Specification Page

PVNGS UNITS 1, 2, and 3: Page 3.9.5-1

3.9 REFUELING OPERATIONS

3.9.5 Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level

LCO 3.9.5 Two SDC loops shall be OPERABLE, and one SDC loop shall be in operation.

----------NOTES----------

1. The required SDC loop may be removed from operation for ≤ 1 hour per 8 hour period, provided no operations are permitted that would cause reduction of the Reactor Coolant System boron concentration.
2. One required SDC loop may be inoperable for up to 2 hours for surveillance testing, provided the other SDC loop is OPERABLE and in operation.

APPLICABILITY: MODE 6 with the water level < 23 ft above the top of reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One SDC loop inoperable.	A.1	Initiate action to restore SDC loop to OPERABLE status.	Immediately
	OR		
	A.2	Initiate action to establish ≥ 23 ft of water above the top of reactor vessel flange.	Immediately

Attachment 5

Associated Changes To The Technical Specification Bases

(For Information Only)

BASES

LCO

In MODE 6, with the water level < 23 ft above the top of the reactor vessel flange, both SDC loops must be OPERABLE. Additionally, one loop of the SDC System must be in operation in order to provide:

a. Removal of decay heat;

b. Mixing of borated coolant to minimize the possibility of a criticality; and

c. Indication of reactor coolant temperature.

An OPERABLE SDC train is composed of an OPERABLE SDC pump (LPSI or CS) capable of providing flow to the SDC heat exchanger for heat removal. SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow (current Section XI), if required.

Both SDC pumps may be aligned to the Refueling Water Tank (RWT) to support filling the refueling cavity or for performance of required testing.

The LCO is modified by a Note that allows a required operating SDC loop to be removed from service for up to 1 hour in each 8 hour period, provided no operations are permitted that would cause a reduction of the RCS boron concentration. Boron concentration reduction is prohibited because uniform concentration distribution cannot be ensured without forced circulation. This permits operations such as core mapping or alterations in the vicinity of the reactor vessel hot leg nozzles, surveillance testing of ECCS pumps, and RCS to SDC isolation valve testing. During this 1 hour period, decay heat is removed by natural convection to the large mass of water in the refueling cavity.

INSERT →

APPLICABILITY

Two SDC loops are required to be OPERABLE, and one SDC loop must be in operation in MODE 6, with the water level < 23 ft above the top of the reactor vessel flange, to provide decay heat removal. Requirements for the SDC System in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System. MODE 6 requirements, with a water level ≥ 23 ft above the reactor vessel flange, are covered in LCO 3.9.4, "Shutdown Cooling and Coolant Circulation - High Water Level."

Technical Specification Bases, B 3.9.5 Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level

INSERT:

This LCO is modified by a Note that allows one SDC loop to be inoperable for a period of 2 hours provided the other loop is OPERABLE and in operation. Prior to declaring the loop inoperable, consideration shall be given to the existing plant configuration. This consideration shall include as a minimum that the core time to boil is short, there is no draining operation to further reduce RCS water level and that the capability exists to inject borated water into the reactor vessel. This permits surveillance tests to be performed on the inoperable loop during a time when these tests are safe and possible.

Attachment

TECHNICAL SPECIFICATION TASK FORCE

TRAVELER NUMBER 361, REVISION 2

(For Information Only)

Industry/TSTF Standard Technical Specification Change Traveler

Allow standby SDC/RHR/DHR loop to inoperable to support testing

Classification: 2) Consistency/Standardization

NUREGs Affected: ☑ 1430 ☑ 1431 ☑ 1432 ☐ 1433 ☐ 1434

Description:

Add a Note to LCO 3.9.5. "SDC and Coolant Circulation - Low Water Level" which states, "One SDC loop may be inoperable for <= 2 hours for surveillance testing provided the other SDC loop is OPERABLE and in operation."

Justification:

LCO 3.9.5 currently does not allow the non-operating SDC loop to be made inoperable to support surveillance testing. LCOs 3.4.7 and 3.4.8 both allow the non-operating SDC loop to be inoperable for a period of up to 2 hours to perform surveillance testing, provide the other SDC loop is OPERABLE and operating. The Note is needed in LCO 3.9.5 to provide the flexibility to perform surveillance testing while ensuring that there is reasonable time for operators to respond to and mitigate any expected failures. Therefore, for consistency, and to support required outage activities and still maintain the plant in a safe condition, this Note should be added to LCO 3.9.5.

Industry Contact:	Weber, Tom	(602) 393-5764	tweber01@apsc.com
NRC Contact:	Tjader, Bob	301-415-1187	trt@nrc.gov

Revision History

OG Revision 0 Revision Status: Closed

Revision Proposed by: CEOG

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 27-Jul-99

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 27-Jul-99

TSTF Review Information

TSTF Received Date: 08-Dec-99 Date Distributed for Review 08-Dec-99

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:
Applicable to PWRs only.

TSTF Resolution: Approved Date: 14-Dec-99

NRC Review Information

NRC Received Date: 27-Dec-99

NRC Comments:
NRC provided verbal comments to T. Weber. TSTF considering.

7/2/00

OG Revision 0 **Revision Status: Closed**

Final Resolution: Superceded by Revision Final Resolution Date:

TSTF Revision 1 **Revision Status: Closed**

Revision Proposed by: NRC

Revision Description:
Revised to address NRC comments. The following is added to the SR Note Bases, "Prior to declaring the [DHR/RHR/SDC] loop inoperable, consideration should be given to the existing plant configuration, the relative risks associated with declaring the loop inoperable (including the time to boil if the plant is in reduced inventory condition), and any compensatory actions that are necessary."

TSTF Review Information

TSTF Received Date: 20-Apr-00 Date Distributed for Review 20-Apr-00

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:
(No Comments)

TSTF Resolution: Approved Date: 20-Apr-00

NRC Review Information

NRC Received Date: 05-May-00

NRC Comments:
(No Comments)

Final Resolution: Superceded by Revision Final Resolution Date: 14-Jun-00

TSTF Revision 2 **Revision Status: Active** **Next Action:**

Revision Proposed by: CEOG

Revision Description:
Revise the LCO Note Bases (Inserts 2, 4, and 6) to reflect discussions between the NRC and the TSTF. Revised the justification to clearly explain the need for the change.

TSTF Review Information

TSTF Received Date: 30-Jun-00 Date Distributed for Review

OG Review Completed: ☐ BWOG ☐ WOG ☐ CEOG ☐ BWROG

TSTF Comments:
(No Comments)

TSTF Resolution: Date:

Incorporation Into the NUREGs

File to BBS/LAN Date: TSTF Informed Date: TSTF Approved Date:

7/2/00

NUREG Rev Incorporated:

Affected Technical Specifications

LCO 3.9.5	DHR and Coolant Circulation - Low Water Level	NUREG(s)- 1430 Only
LCO 3.9.5 Bases	DHR and Coolant Circulation - Low Water Level	NUREG(s)- 1430 Only
LCO 3.9.6	RHR and Coolant Circulation - Low Water Level	NUREG(s)- 1431 Only
LCO 3.9.6 Bases	RHR and Coolant Circulation - Low Water Level	NUREG(s)- 1431 Only
LCO 3.9.5	SDC and Coolant Circulation - Low Water Level	NUREG(s)- 1432 Only
LCO 3.9.5 Bases	SDC and Coolant Circulation - Low Water Level	NUREG(s)- 1432 Only

INSERT 1

---------- NOTE ----------
One required DHR loop may be inoperable for up to 2 hours for surveillance testing, provided that the other DHR loop is OPERABLE and in operation.

INSERT 2

This LCO is modified by a Note that allows one DHR loop to be inoperable for a period of 2 hours provided the other loop is OPERABLE and in operation. Prior to declaring the loop inoperable, consideration should be given to the existing plant configuration. This consideration should include that the core time to boil is short, there is no draining operation to further reduce RCS water level and that the capability exists to inject borated water into the reactor vessel. This permits surveillance tests to be performed on the inoperable loop during a time when these tests are safe and possible.

INSERT 3

---------- NOTE ----------
One required RHR loop may be inoperable for up to 2 hours for surveillance testing, provided that the other RHR loop is OPERABLE and in operation.

INSERT 4

This LCO is modified by a Note that allows one RHR loop to be inoperable for a period of 2 hours provided the other loop is OPERABLE and in operation. Prior to declaring the loop inoperable, consideration should be given to the existing plant configuration. This consideration should include that the core time to boil is short, there is no draining operation to further reduce RCS water level and that the capability exists to inject borated water into the reactor vessel. This permits surveillance tests to be performed on the inoperable loop during a time when these tests are safe and possible.

INSERT 5

---------- NOTE ----------
One required SDC loop may be inoperable for up to 2 hours for surveillance testing, provided that the other SDC loop is OPERABLE and in operation.

INSERT 6

This LCO is modified by a Note that allows one SDC loop to be inoperable for a period of 2 hours provided the other loop is OPERABLE and in operation. Prior to declaring the loop inoperable, consideration should be given to the existing plant configuration. This consideration should include that the core time to boil is short, there is no draining operation to further reduce RCS water level and that the capability exists to inject borated water into the reactor vessel. This permits surveillance tests to be performed on the inoperable loop during a time when these tests are safe and possible.

3.9 REFUELING OPERATIONS

3.9.5 Decay Heat Removal (DHR) and Coolant Circulation—Low Water Level

LCO 3.9.5 Two DHR loops shall be OPERABLE, and one DHR loop shall be in operation.

Insert 1 →

APPLICABILITY: MODE 6 with the water level < 23 ft above the top of reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Less than required number of DHR loops OPERABLE.	A.1	Initiate action to restore DHR loop to OPERABLE status.	Immediately
	OR		
	A.2	Initiate action to establish ≥ 23 ft of water above the top of reactor vessel flange.	Immediately
B. No DHR loop OPERABLE or in operation.	B.1	Suspend operations involving a reduction in reactor coolant boron concentration.	Immediately
	AND		
	B.2	Initiate action to restore one DHR loop to OPERABLE status and to operation.	Immediately
	AND		(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

reduction. Therefore, the DHR System is retained as a Specification.

LCO

In MODE 6, with the water level < 23 ft above the top of the reactor vessel flange, two DHR loops must be OPERABLE. Additionally, one DHR loop must be in operation to provide:

a. Removal of decay heat;

b. Mixing of borated coolant to minimize the possibility of criticality; and

Insert 2

c. Indication of reactor coolant temperature.

An OPERABLE DHR loop consists of a DHR pump, a heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path and to determine the low end temperature. The flow path starts in one of the RCS hot legs and is returned to the RCS cold legs.

APPLICABILITY

Two DHR loops are required to be OPERABLE, and one in operation in MODE 6, with the water level < 23 ft above the top of the reactor vessel flange, to provide decay heat removal. Requirements for the DHR System in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS), and Section 3.5, Emergency Core Cooling Systems (ECCS). DHR loop requirements in MODE 6, with the water level ≥ 23 ft above the top of the reactor vessel flange, are located in LCO 3.9.4, "Decay Heat Removal (DHR) and Coolant Circulation—High Water Level."

ACTIONS

A.1 and A.2

With fewer than the required loops OPERABLE, action shall be immediately initiated and continued until the DHR loop is restored to OPERABLE status or until ≥ 23 ft of water level is established above the reactor vessel flange. When the water level is established at ≥ 23 ft above the reactor

(continued)

3.9 REFUELING OPERATIONS

3.9.6 Residual Heat Removal (RHR) and Coolant Circulation—Low Water Level

LCO 3.9.6 Two RHR loops shall be OPERABLE, and one RHR loop shall be in operation.

Insert 3 →

APPLICABILITY: MODE 6 with the water level < 23 ft above the top of reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Less than the required number of RHR loops OPERABLE.	A.1 Initiate action to restore required RHR loops to OPERABLE status. OR A.2 Initiate action to establish ≥ 23 ft of water above the top of reactor vessel flange.	Immediately Immediately
B. No RHR loop in operation.	B.1 Suspend operations involving a reduction in reactor coolant boron concentration. AND	Immediately (continued)

BASES

LCO (continued)

Additionally, one loop of RHR must be in operation in order to provide:

a. Removal of decay heat;

b. Mixing of borated coolant to minimize the possibility of criticality; and

Insert 4

c. Indication of reactor coolant temperature.

An OPERABLE RHR loop consists of an RHR pump, a heat exchanger, valves, piping, instruments and controls to ensure an OPERABLE flow path and to determine the low end temperature. The flow path starts in one of the RCS hot legs and is returned to the RCS cold legs.

APPLICABILITY

Two RHR loops are required to be OPERABLE, and one RHR loop must be in operation in MODE 6, with the water level < 23 ft above the top of the reactor vessel flange, to provide decay heat removal. Requirements for the RHR System in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS), and Section 3.5, Emergency Core Cooling Systems (ECCS). RHR loop requirements in MODE 6 with the water level ≥ 23 ft are located in LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation—High Water Level."

ACTIONS

A.1 and A.2

If less than the required number of RHR loops are OPERABLE, action shall be immediately initiated and continued until the RHR loop is restored to OPERABLE status and to operation or until ≥ 23 ft of water level is established above the reactor vessel flange. When the water level is ≥ 23 ft above the reactor vessel flange, the Applicability changes to that of LCO 3.9.5, and only one RHR loop is required to be OPERABLE and in operation. An immediate Completion Time is necessary for an operator to initiate corrective actions.

(continued)

3.9 REFUELING OPERATIONS

3.9.5 Shutdown Cooling (SDC) and Coolant Circulation—Low Water Level

LCO 3.9.5 Two SDC loops shall be OPERABLE, and one SDC loop shall be in operation.

Insert 5 →

APPLICABILITY: MODE 6 with the water level < 23 ft above the top of reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SDC loop inoperable.	A.1 Initiate action to restore SDC loop to OPERABLE status. OR A.2 Initiate action to establish ≥ 23 ft of water above the top of reactor vessel flange.	Immediately Immediately
B. No SDC loop OPERABLE or in operation.	B.1 Suspend operations involving a reduction in reactor coolant boron concentration. AND B.2 Initiate action to restore one SDC loop to OPERABLE status and to operation. AND	Immediately Immediately (continued)

BASES (continued)

LCO

In MODE 6, with the water level < 23 ft above the top of the reactor vessel flange, both SDC loops must be OPERABLE. Additionally, one loop of the SDC System must be in operation in order to provide:

a. Removal of decay heat;

b. Mixing of borated coolant to minimize the possibility of a criticality; and

Insert 6

c. Indication of reactor coolant temperature.

An OPERABLE SDC loop consists of an SDC pump, a heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path and to determine the low end temperature. The flow path starts in one of the RCS hot legs and is returned to the RCS cold legs.

APPLICABILITY

Two SDC loops are required to be OPERABLE, and one SDC loop must be in operation in MODE 6, with the water level < 23 ft above the top of the reactor vessel flange, to provide decay heat removal. Requirements for the SDC System in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System. MODE 6 requirements, with a water level ≥ 23 ft above the reactor vessel flange, are covered in LCO 3.9.4, "Shutdown Cooling and Coolant Circulation—High Water Level."

ACTIONS

A.1 and A.2

If one SDC loop is inoperable, action shall be immediately initiated and continued until the SDC loop is restored to OPERABLE status and to operation, or until ≥ 23 ft of water level is established above the reactor vessel flange. When the water level is established at ≥ 23 ft above the reactor vessel flange, the Applicability will change to that of LCO 3.9.4, "Shutdown Cooling and Coolant Circulation—High Water Level," and only one SDC loop is required to be OPERABLE and in operation. An immediate Completion Time is necessary for an operator to initiate corrective actions.

(continued)