February 13, 2006 TSTF-06-02

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

SUBJECT: TSTF-459, Revision 1, "Provide an Exception to the Requirement to Have One RHR Shutdown Cooling System in Operation"

Dear Sir or Madam:

Enclosed for NRC review is Revision 1 of TSTF-459, "Provide an Exception to the Requirement to Have One RHR Shutdown Cooling System in Operation." This revision incorporates NRC requested changes.

Any NRC review fees associated with the review of TSTF-459, Revision 1 should be billed to the Boiling Water Reactors Owners Group.

Should you have any questions, please do not hesitate to contact us.

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Enclosure

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# Technical Specification Task Force
# Improved Standard Technical Specifications Change Traveler

**Provide an Exception to the Requirement to Have One RHR Shutdown Cooling System in Operation**

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

Classification: 3) Improve Specifications Recommended for CLIIP?: Yes

Correction or Improvement: Improvement NRC Fee Status: Not Exempt

Benefit: Shortens Outages

Industry Contact: Mike Crowthers, (610) 774-7766, mhcrowthers@pplweb.com

See attached.

## Revision History

### OG Revision 0 Revision Status: Closed

Revision Proposed by:

Revision Description:
Original Issue

#### Owners Group Review Information

Date Originated by OG: 16-May-97

Owners Group Comments
2/14/2001 - discussed by TSTF. Needs Safety Evaluation quality justification and be marked on Revision 2 pages.

Owners Group Resolution: Approved Date: 21-Sep-99

### OG Revision 1 Revision Status: Closed

Revision Proposed by: BWROG

Revision Description:
Remarked on Revision 2 pages and expanded justification to SE quality.

#### Owners Group Review Information

Date Originated by OG: 21-May-03

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 21-May-03

#### TSTF Review Information

TSTF Received Date: 08-Aug-03 Date Distributed for Review 12-Aug-03

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

## OG Revision 1 Revision Status: Closed

TSTF Comments:
(No Comments)

TSTF Resolution: Approved Date: 26-Aug-03

### NRC Review Information

NRC Received Date: 19-Sep-03

NRC Comments:
NRC requested a revision.

Final Resolution: Superceded by Revision

## TSTF Revision 1 Revision Status: Active

Revision Proposed by: BWROG

Revision Description:
Revision 1 is a complete replacement of Revision 0. On a teleconference with the NRC on 3/17/04, the NRC indicated that they were not willing to change the LCO to not require an RHR subsystem to be in operation but they would consider a change to increase the flexibility provided by the existing LCO Note.

This revision responds to that comment by retaining the existing LCO and Actions, but expanding the applicability of the LCO Notes.

### Owners Group Review Information

Date Originated by OG: 31-Oct-05

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 13-Dec-05

### TSTF Review Information

TSTF Received Date: 03-Jan-06 Date Distributed for Review 03-Jan-06

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

TSTF Comments:
(No Comments)

TSTF Resolution: Approved Date: 13-Feb-06

### NRC Review Information

NRC Received Date: 13-Feb-06

**TSTF Revision 1** **Revision Status: Active**

## Affected Technical Specifications

| | | |
|---|---|---|
| LCO 3.9.8 | RHR - High Water Level | |
| LCO 3.9.8 Bases | RHR - High Water Level | |
| Appl. 3.9.8 Bases | RHR - High Water Level | |
| SR 3.9.8.1 | RHR - High Water Level | |
| SR 3.9.8.1 Bases | RHR - High Water Level | |
| LCO 3.9.9 | RHR - Low Water Level | |
| LCO 3.9.9 Bases | RHR - Low Water Level | |
| Appl. 3.9.9 Bases | RHR - Low Water Level | |
| SR 3.9.9.1 | RHR - Low Water Level | |
| SR 3.9.9.1 Bases | RHR - Low Water Level | |
| LCO 3.4.9 | RHR Shutdown Cooling System - Cold Shutdown | NUREG(s)- 1433 Only |
| LCO 3.4.9 Bases | RHR Shutdown Cooling System - Cold Shutdown | NUREG(s)- 1433 Only |
| SR 3.4.9.1 | RHR Shutdown Cooling System - Cold Shutdown | NUREG(s)- 1433 Only |
| SR 3.4.9.1 Bases | RHR Shutdown Cooling System - Cold Shutdown | NUREG(s)- 1433 Only |
| LCO 3.4.10 | RHR Shutdown Cooling System - Cold Shutdown | NUREG(s)- 1434 Only |
| LCO 3.4.10 Bases | RHR Shutdown Cooling System - Cold Shutdown | NUREG(s)- 1434 Only |
| SR 3.4.10.1 | RHR Shutdown Cooling System - Cold Shutdown | NUREG(s)- 1434 Only |
| SR 3.4.10.1 Bases | RHR Shutdown Cooling System - Cold Shutdown | NUREG(s)- 1434 Only |

## 1.0 Description

This change will revise the BWR/4 and BWR/6 ISTS NUREGs to not require an RHR Shutdown Cooling System to be in operation in MODE 3 with reactor steam dome pressure < [the RHR cut in permissive pressure], MODE 4, and MODE 5 with irradiated fuel in the reactor pressure vessel provided RCS temperature is maintained ≤ [200]° F. The RHR Shutdown Cooling System must still be OPERABLE but is not required to be in operation.

## 2.0 Proposed Change

The Limiting Conditions for Operation (LCO) Notes of the following Specifications are revised to allow both RHR shutdown cooling subsystems and recirculation pumps to be removed from operation provided that RCS temperature is ≤ [200]° F.

- BWR/4 LCO 3.4.9, RHR Shutdown Cooling System - Cold Shutdown
- BWR/4 LCO 3.9.8, RHR - High Water Level
- BWR/4 LCO 3.9.9, RHR - Low Water Level
- BWR/6 LCO 3.4.10, RHR Shutdown Cooling System - Cold Shutdown
- BWR/6 LCO 3.9.8, RHR - High Water Level
- BWR/6 LCO 3.9.9, RHR - Low Water Level

The Surveillance of each of the Specifications listed above is revised from verifying that an RHR shutdown cooling subsystem is operating every 12 hours to verifying that each required RHR shutdown cooling subsystem is operating every 12 hours. If the RHR shutdown cooling subsystem is not required to be operating in accordance with the LCO Note, the SR does not have to be performed.

It is not necessary to modify the Actions or to specify "required" in the Actions as a result of this change. If the LCO Note is being met, the LCO is considered met and it is not necessary to follow any Actions. If the LCO Note is not being met, the Actions are correct as written.

## 3.0 Background

The RHR Shutdown Cooling (SDC) System is one mode of operation of the RHR System. This mode is associated with a UFSAR "Power Generation Objective," such that the system can "remove decay and residual heat from the reactor core to achieve and maintain a cold shutdown condition." This normal operational mode of RHR utilizes a single suction path from one recirculation loop, which is common to both RHR divisions. Also, the RHR SDC provides circulation of the reactor coolant to aid in the measurement of average reactor coolant temperature. The RHR SDC System is not required for mitigation of any event or accident evaluated in the safety analyses.

The change to the subject LCOs will allow RHR SDC operation to be established based on the plant conditions and will facilitate operational evolutions, such as in-vessel inspections and RHR SDC relief valve testing.

## 4.0 Technical Analysis

RHR SDC subsystems are operated when it is desired by plant operations to reduce reactor coolant temperature. Operation may also be desired on occasion to ensure adequate core flow to allow for accurate average reactor coolant temperature monitoring. Monitoring of average reactor coolant temperature may be accomplished by continuous or intermittent operation of the subsystems, or by other systems and is associated with normal operational monitoring.

Industry commitment to NUMARC 91-06, Shutdown Risk Management, requires that plants have a conservative estimate of the time to boil for the reactor coolant system. Continuous, forced reactor coolant flow solely for the purpose of mixing to measure reactor coolant temperature is overly conservative. Natural circulation will provide sufficient mixing to obtain a reasonable estimate of average reactor coolant temperature. Periodic measurement of reactor coolant temperature or the use of temporary or alternate temperature measurement instruments, when combined with a conservatively calculated time to boil, are sufficient to assure plant safety.

Unlike Pressurized Water Reactors, Boiling Water Reactors do not use boron in the reactor coolant for normal shutdown margin. Therefore, continuous operation of RHR SDC to ensure mixing of a borated solution is also not required for this purpose. BWRs may use the Standby Liquid Control (SLC) System to inject boron into the reactor coolant system, but the SLC System is not required to be OPERABLE in the MODES in which these LCOs are applicable.

The RHR SDC System is still required to be OPERABLE with this change. The system pumps can be started and stopped as dictated by plant conditions. Reactor coolant temperature can be controlled as plant conditions dictate, including maintaining adequate cooling to avoid inadvertently changing MODE.

Continuous operation of a SDC subsystem is not required to adequately perform the decay heat removal function. Establishing coolant circulation during shutdown conditions for the purpose of temperature indication of the reactor coolant is related to plant specific procedures for measuring reactor coolant system temperature.

Allowing the stopping (and subsequent re-starting) of RHR pumps is allowed by the current RHR SDC Specifications to change operating loops or by the Notes to the various RHR-SDC LCOs. Furthermore, the actual cooling function provided by the RHR service water system (providing cooling water to the RHR heat exchanger) is not required to be continuously operating. Operability of the RHR-SDC system, which includes the required pumps, presumes the ability to start (and re-start) any required pump. As such, these changes do not introduce any new or different failure modes nor any increased risk of loss of decay heat removal capability.

The revised Specifications are similar to the Specifications governing other required modes of RHR operation. Specification 3.6.2.3, "RHR Suppression Pool Cooling," requires two RHR subsystems to be OPERABLE, but does not require a system to be in operation. It is assumed that the pumps can and will be started as required for plant safety.

The RHR-SDC Surveillance Requirement is also revised to require periodic verification that the system is operating only when the system is required. This change is consistent with the wording of other SRs that allow certain systems to be made inoperable or not in operation.

## 5.0 Regulatory Analysis

### 5.1 No Significant Hazards Consideration

The TSTF has evaluated whether or not a significant hazards consideration is involved with the proposed generic change by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

   Response: No.

   The proposed change allows the Residual Heat Removal Shutdown Cooling (RHR SDC) System to not be in continuous operation. The RHR SDC System is not a precursor to any accident previously evaluated. The RHR SDC System is not required for mitigation of any accident previously evaluated. The proposed changes do not adversely affect the accident design assumptions, conditions, or configuration of the facility. The proposed changes do not alter or prevent the ability of structures, systems, and components (SSCs) from performing their intended function.

   Therefore, it is concluded that this change does not significantly increase the probability or consequences of an accident previously evaluated.

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

   Response: No.

   The proposed change allows the Residual Heat Removal Shutdown Cooling (RHR SDC) System to not be in continuous operation. This revision will not impact the accident analysis. The changes will not alter the methods of operation of the RHR SDC System. No new or different accidents result. The changes do not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. The changes do not alter assumptions made in the safety analysis.

   Therefore, the possibility of a new or different kind of accident from any accident previously evaluated is not created.

1. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No.

   The proposed changes do not alter the manner in which safety limits, limiting safety system settings or limiting conditions for operation are determined. The safety analysis acceptance criteria are not affected by these changes. The proposed changes will not result in plant operation in a configuration outside the design basis. The level of redundancy required for the RHR SDC system is unaffected. The proposed changes do not adversely affect systems that respond to safely shutdown the plant and to maintain the plant in a safe shutdown condition.

   Therefore, it is concluded that this change does not involve a significant reduction in a margin of safety.

Based on the above, the TSTF concludes that the proposed change presents no significant hazards considerations under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

## 5.2 Applicable Regulatory Requirements/Criteria

The proposed changes to the Improved Standard Technical Specifications do not change the design requirements for the RHR Shutdown Cooling System and the RHR shutdown Cooling System will continue to comply with applicable regulatory requirements and criteria. The system design will still be consistent with GDC 34, Residual heat removal. 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 approval of the proposed change will not be inimical to the common defense and security or to the health and safety of the public.

## 6.0 Environmental Consideration

A review has determined that the proposed change 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 change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change 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 change.

## 7.0 References

None.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown

LCO 3.4.9 Two RHR shutdown cooling subsystems shall be OPERABLE, and, with no recirculation pump in operation, at least one RHR shutdown cooling subsystem shall be in operation.

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

1. Both RHR shutdown cooling subsystems and recirculation pumps may be removed from operation provided RCS temperature is ≤ [200]°F~~for up to 2 hours per 8 hour period~~.

2. One RHR shutdown cooling subsystem may be inoperable for up to 2 hours for the performance of Surveillances.

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APPLICABILITY: MODE 4.

ACTIONS

----------NOTE----------

Separate Condition entry is allowed for each shutdown cooling subsystem.

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| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. One or two RHR shutdown cooling subsystems inoperable. | A.1 Verify an alternate method of decay heat removal is available for each inoperable RHR shutdown cooling subsystem. | 1 hour<br><br>AND<br><br>Once per 24 hours thereafter |
| B. No RHR shutdown cooling subsystem in operation.<br><br>AND<br><br>No recirculation pump in operation. | B.1 Verify reactor coolant circulating by an alternate method.<br><br>AND | 1 hour from discovery of no reactor coolant circulation<br><br>AND<br><br>Once per 12 hours thereafter |

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| | B.2 Monitor reactor coolant temperature. | Once per hour |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.4.9.1 | Verify one required RHR shutdown cooling subsystem or recirculation pump is operating. | 12 hours |

3.9 REFUELING OPERATIONS

3.9.8 Residual Heat Removal (RHR) - High Water Level

LCO 3.9.8 One RHR shutdown cooling subsystem shall be OPERABLE and in operation.

----------NOTE----------
The required RHR shutdown cooling subsystem may be removed from operation provided RCS temperature is ≤ [200]°F~~for up to 2 hours per 8 hour period~~.
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APPLICABILITY: MODE 5 with irradiated fuel in the reactor pressure vessel (RPV) and the water level ≥ [23] ft above the top of the [RPV flange].

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. Required RHR shutdown cooling subsystem inoperable. | A.1 Verify an alternate method of decay heat removal is available. | 1 hour<br>AND<br>Once per 24 hours thereafter |
| B. Required Action and associated Completion Time of Condition A not met. | B.1 Suspend loading irradiated fuel assemblies into the RPV.<br>AND<br>B.2 Initiate action to restore [secondary] containment to OPERABLE status.<br>AND | Immediately<br><br>Immediately |

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| | B.3 Initiate action to restore one standby gas treatment subsystem to OPERABLE status.<br><br>AND | Immediately |
| | B.4 Initiate action to restore isolation capability in each required [secondary] containment penetration flow path not isolated. | Immediately |
| C. No RHR shutdown cooling subsystem in operation. | C.1 Verify reactor coolant circulation by an alternate method.<br><br>AND | 1 hour from discovery of no reactor coolant circulation<br><br>AND<br><br>Once per 12 hours thereafter |
| | C.2 Monitor reactor coolant temperature. | Once per hour |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.9.8.1 | Verify one required RHR shutdown cooling subsystem is operating. | 12 hours |

## 3.9 REFUELING OPERATIONS

### 3.9.9 Residual Heat Removal (RHR) - Low Water Level

LCO 3.9.9 Two RHR shutdown cooling subsystems shall be OPERABLE, and one RHR shutdown cooling subsystem shall be in operation.

----------NOTE----------
The required operating shutdown cooling subsystem may be removed from operation provided RCS temperature is ≤ [200]°F~~for up to 2 hours per 8 hour period~~.
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APPLICABILITY: MODE 5 with irradiated fuel in the reactor pressure vessel (RPV) and the water level < [23] ft above the top of the [RPV flange].

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| A. One or two required RHR shutdown cooling subsystems inoperable. | A.1 | Verify an alternate method of decay heat removal is available for each inoperable required RHR shutdown cooling subsystem. | 1 hour<br><br>AND<br><br>Once per 24 hours thereafter |
| B. Required Action and associated Completion Time of Condition A not met. | B.1 | Initiate action to restore [secondary] containment to OPERABLE status. | Immediately |
| | AND | | |
| | B.2 | Initiate action to restore one standby gas treatment subsystem to OPERABLE status. | Immediately |
| | AND | | |

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| | B.3 Initiate action to restore isolation capability in each required [secondary] containment penetration flow path not isolated. | Immediately |
| C. No RHR shutdown cooling subsystem in operation. | C.1 Verify reactor coolant circulation by an alternate method.<br><br>AND<br><br>C.2 Monitor reactor coolant temperature. | 1 hour from discovery of no reactor coolant circulation<br><br>AND<br><br>Once per 12 hours thereafter<br><br>Once per hour |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.9.9.1 | Verify one required RHR shutdown cooling subsystem is operating. | 12 hours |

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.9 Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown

BASES

| | |
|---|---|
| BACKGROUND | Irradiated fuel in the shutdown reactor core generates heat during the decay of fission products and increases the temperature of the reactor coolant. This decay heat must be removed to maintain the temperature of the reactor coolant ≤ 200°F. This decay heat removal is in preparation for performing refueling or maintenance operations, or for keeping the reactor in the Cold Shutdown condition.<br><br>The two redundant, manually controlled shutdown cooling subsystems of the RHR System provide decay heat removal. Each loop consists of two motor driven pumps, a heat exchanger, and associated piping and valves. Both loops have a common suction from the same recirculation loop. Each pump discharges the reactor coolant, after circulation through the respective heat exchanger, to the reactor via the associated recirculation loop. The RHR heat exchangers transfer heat to the RHR Service Water System. |
| APPLICABLE SAFETY ANALYSES | Decay heat removal by operation of the RHR System in the shutdown cooling mode is not required for mitigation of any event or accident evaluated in the safety analyses. Decay heat removal is, however, an important safety function that must be accomplished or core damage could result. The RHR Shutdown Cooling System satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii). |
| LCO | Two RHR shutdown cooling subsystems are required to be OPERABLE, and when no recirculation pump is in operation, one RHR shutdown cooling subsystem ~~must~~ is required to be in operation. An OPERABLE RHR shutdown cooling subsystem consists of one OPERABLE RHR pump, one heat exchanger, and the associated piping and valves. The two subsystems have a common suction source and are allowed to have a common heat exchanger and common discharge piping. Thus, to meet the LCO, both pumps in one loop or one pump in each of the two loops must be OPERABLE. Since the piping and heat exchangers are passive components that are assumed not to fail, they are allowed to be common to both subsystems. In MODE 4, the RHR cross tie valve (2E11-F010) may be opened to allow pumps in one loop to discharge through the opposite recirculation loop to make a complete subsystem. Additionally, each shutdown cooling subsystem is considered OPERABLE if it can be manually aligned (remote or local) in the shutdown cooling mode for removal of decay heat. In MODE 4, one RHR shutdown cooling |

BASES

LCO (continued)

subsystem can provide the required cooling, but two subsystems are required to be OPERABLE to provide redundancy. Operation of one subsystem can maintain or reduce the reactor coolant temperature as required. ~~However, to ensure adequate core flow to allow for accurate average reactor coolant temperature monitoring, nearly continuous operation is required.~~

Note 1 permits both RHR shutdown cooling subsystems to be removed from operation provided RCS temperature is ≤ [200]°F~~for a period of 2 hours in an 8 hour period~~. This is permitted because natural circulation is often sufficient to maintain RCS temperature without an RHR shutdown cooling subsystem in operation.

---------- Reviewer's Note ----------
The [200]°F temperature used in the Note should be the same temperature used for MODE 3 to MODE 4 transition in Table 1.1-1.
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Note 2 allows one RHR shutdown cooling subsystem to be inoperable for up to 2 hours for the performance of Surveillance tests. These tests may be on the affected RHR System or on some other plant system or component that necessitates placing the RHR System in an inoperable status during the performance. This is permitted because the core heat generation can be low enough and the heatup rate slow enough to allow some changes to the RHR subsystems or other operations requiring RHR flow interruption and loss of redundancy.

APPLICABILITY

In MODE 4, the RHR Shutdown Cooling System may be operated in the shutdown cooling mode to remove decay heat to maintain coolant temperature below 200°F. Otherwise, a recirculation pump is required to be in operation.

In MODES 1 and 2, and in MODE 3 with reactor steam dome pressure greater than or equal to the RHR cut in permissive pressure, this LCO is not applicable. Operation of the RHR System in the shutdown cooling mode is not allowed above this pressure because the RCS pressure may exceed the design pressure of the shutdown cooling piping. Decay heat removal at reactor pressures greater than or equal to the RHR cut in permissive pressure is typically accomplished by condensing the steam in the main condenser. Additionally, in MODE 2 below this pressure, the OPERABILITY requirements for the Emergency Core Cooling Systems (ECCS) (LCO 3.5.1, "ECCS - Operating") do not allow placing the RHR shutdown cooling subsystem into operation.

The requirements for decay heat removal in MODE 3 below the cut in permissive pressure and in MODE 5 are discussed in LCO 3.4.8,

BASES

ACTIONS (continued)

B.1 and B.2

With no RHR shutdown cooling subsystem and no recirculation pump in operation, except as permitted by LCO Note 1, and until RHR or recirculation pump operation is re-established, an alternate method of reactor coolant circulation must be placed into service. This will provide the necessary circulation for monitoring coolant temperature. The 1 hour Completion Time is based on the coolant circulation function and is modified such that the 1 hour is applicable separately for each occurrence involving a loss of coolant circulation. Furthermore, verification of the functioning of the alternate method must be reconfirmed every 12 hours thereafter. This will provide assurance of continued temperature monitoring capability.

During the period when the reactor coolant is being circulated by an alternate method (other than by the required RHR Shutdown Cooling System or recirculation pump), the reactor coolant temperature and pressure must be periodically monitored to ensure proper function of the alternate method. The once per hour Completion Time is deemed appropriate.

SURVEILLANCE REQUIREMENTS

SR 3.4.9.1

This Surveillance verifies that one required RHR shutdown cooling subsystem or recirculation pump is in operation and circulating reactor coolant. The required flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability. The Frequency of 12 hours is sufficient in view of other visual and audible indications available to the operator for monitoring the RHR subsystem in the control room.

REFERENCES None.

BASES

LCO (continued)

Additionally, each RHR shutdown cooling subsystem is considered OPERABLE if it can be manually aligned (remote or local) in the shutdown cooling mode for removal of decay heat. Operation (either continuous or intermittent) of one subsystem can maintain and reduce the reactor coolant temperature as required. ~~However, to ensure adequate core flow to allow for accurate average reactor coolant temperature monitoring, nearly continuous operation is required.~~

A Note permits the RHR shutdown cooling subsystem to be removed from operation provided RCS temperature is ≤ [200]°F. This is permitted because natural circulation is often sufficient to maintain RCS temperature without an RHR shutdown cooling subsystem in operation.

---------- Reviewer's Note ----------
The [200]°F temperature used in the Note should be the same temperature used for MODE 3 to MODE 4 transition in Table 1.1-1.
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~~A Note is provided to allow a 2 hour exception for the operating subsystem to be removed from operation every 8 hours.~~

APPLICABILITY

One RHR shutdown cooling subsystem ~~must~~ is required to be OPERABLE and is required to be in operation in MODE 5, with irradiated fuel in the reactor pressure vessel and with the water level ≥ [23] feet above the top of the RPV flange, to provide decay heat removal. RHR System requirements in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS); Section 3.5, Emergency Core Cooling Systems (ECCS) and Reactor Core Isolation Cooling (RCIC) System; and Section 3.6, Containment Systems. RHR Shutdown Cooling System requirements in MODE 5 with irradiated fuel in the reactor pressure vessel and with the water level < [23] ft above the RPV flange are given in LCO 3.9.9.

ACTIONS

A.1

With no RHR shutdown cooling subsystem OPERABLE, an alternate method of decay heat removal must be established within 1 hour. In this condition, the volume of water above the RPV flange provides adequate capability to remove decay heat from the reactor core. However, the overall reliability is reduced because loss of water level could result in reduced decay heat removal capability. The 1 hour Completion Time is based on decay heat removal function and the probability of a loss of the available decay heat removal capabilities. Furthermore, verification of the functional availability of these alternate method(s) must be reconfirmed every 24 hours thereafter. This will ensure continued heat removal capability.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.9.8.1

This Surveillance demonstrates that the required RHR subsystem is in operation and circulating reactor coolant.

The required flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability. The Frequency of 12 hours is sufficient in view of other visual and audible indications available to the operator for monitoring the RHR subsystem in the control room.

REFERENCES None.

B 3.9 REFUELING OPERATIONS

B 3.9.9 Residual Heat Removal (RHR) - Low Water Level

BASES

BACKGROUND

The purpose of the RHR System in MODE 5 is to remove decay heat and sensible heat from the reactor coolant, as required by GDC 34. Each of the two shutdown cooling loops of the RHR System can provide the required decay heat removal. Each loop consists of two motor driven pumps, a heat exchanger, and associated piping and valves. Both loops have a common suction from the same recirculation loop. Each pump discharges the reactor coolant, after it has been cooled by circulation through the respective heat exchangers, to the reactor via the associated recirculation loop or to the reactor via the low pressure coolant injection path. The RHR heat exchangers transfer heat to the RHR Service Water System. The RHR shutdown cooling mode is manually controlled.

APPLICABLE SAFETY ANALYSES

With the unit in MODE 5, the RHR System is not required to mitigate any events or accidents evaluated in the safety analyses. The RHR System is required for removing decay heat to maintain the temperature of the reactor coolant.

The RHR System satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii).

LCO

In MODE 5 with irradiated fuel in the reactor pressure vessel (RPV) and the water level < 23 ft above the reactor pressure vessel (RPV) flange both RHR shutdown cooling subsystems must be OPERABLE.

An OPERABLE RHR shutdown cooling subsystem consists of an RHR pump, a heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path. To meet the LCO, both pumps in one loop or one pump in each of the two loops must be OPERABLE. In MODE 5, the RHR cross tie valve is not required to be closed; thus, the valve may be opened to allow pumps in one loop to discharge through the opposite loop's heat exchanger to make a complete subsystem.

Additionally, each RHR shutdown cooling subsystem is considered OPERABLE if it can be manually aligned (remote or local) in the shutdown cooling mode for removal of decay heat. Operation (either continuous or intermittent) of one subsystem can maintain and reduce the reactor coolant temperature as required. ~~However, to ensure adequate core flow to allow for accurate average reactor coolant temperature monitoring, nearly continuous operation is required.~~

A Note permits the RHR shutdown cooling subsystem to be removed from operation provided RCS temperature is ≤ [200]°F. This is permitted because natural circulation is often sufficient to maintain RCS temperature without an RHR shutdown cooling subsystem in operation.

~~A Note is provided to allow a 2 hour exception for the operating subsystem to be removed from operation every 8 hours.~~

---------- Reviewer's Note ----------
The [200]°F temperature used in the Note should be the same temperature used for MODE 3 to MODE 4 transition in Table 1.1-1.
---

BASES

APPLICABILITY

Two RHR shutdown cooling subsystems are required to be OPERABLE, and one ~~must~~ is required to be in operation in MODE 5, with irradiated fuel in the RPV and with the water level < [23] ft above the top of the RPV flange, to provide decay heat removal. RHR System requirements in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS); Section 3.5, Emergency Core Cooling Systems (ECCS) and Reactor Core Isolation Cooling (RCIC) System; and Section 3.6, Containment Systems. RHR Shutdown Cooling System requirements in MODE 5 with irradiated fuel in the RPV and with the water level ≥ [23] ft above the RPV flange are given in LCO 3.9.8, "Residual Heat Removal (RHR) - High Water Level."

ACTIONS

A.1

With one of the two required RHR shutdown cooling subsystems inoperable, the remaining subsystem is capable of providing the required decay heat removal. However, the overall reliability is reduced. Therefore an alternate method of decay heat removal must be provided. With both required RHR shutdown cooling subsystems inoperable, an alternate method of decay heat removal must be provided in addition to that provided for the initial RHR shutdown cooling subsystem inoperability. This re-establishes backup decay heat removal capabilities, similar to the requirements of the LCO. The 1 hour Completion Time is based on the decay heat removal function and the probability of a loss of the available decay heat removal capabilities. Furthermore, verification of the functional availability of this alternate method(s) must be reconfirmed every 24 hours thereafter. This will ensure continued heat removal capability.

Alternate decay heat removal methods are available to the operators for review and preplanning in the unit's Operating Procedures. For example, this may include the use of the Reactor Water Cleanup System, operating with the regenerative heat exchanger bypassed. The method used to remove decay heat should be the most prudent choice based on unit conditions.

B.1, B.2, and B.3

With the required decay heat removal subsystem(s) inoperable and the required alternate method(s) of decay heat removal not available in accordance with Required Action A.1, additional actions are required to minimize any potential fission product release to the environment. This includes ensuring secondary containment is OPERABLE; one standby gas treatment subsystem is OPERABLE; and secondary containment

BASES

ACTIONS (continued)

isolation capability (i.e., one secondary containment isolation valve and associated instrumentation are OPERABLE or other acceptable administrative controls to assure isolation capability) in each associated penetration not isolated that is assumed to be isolated to mitigate radioactive releases. This may be performed as an administrative check, by examining logs or other information to determine whether the components are out of service for maintenance or other reasons. It is not necessary to perform the Surveillances needed to demonstrate the OPERABILITY of the components. If, however, any required component is inoperable, then it must be restored to OPERABLE status. In this case, the surveillance may need to be performed to restore the component to OPERABLE status. Actions must continue until all required components are OPERABLE.

C.1 and C.2

If no RHR subsystem is in operation, an alternate method of coolant circulation is required to be established within 1 hour. The Completion Time is modified such that the 1 hour is applicable separately for each occurrence involving a loss of coolant circulation.

During the period when the reactor coolant is being circulated by an alternate method (other than by the required RHR Shutdown Cooling System), the reactor coolant temperature must be periodically monitored to ensure proper functioning of the alternate method. The once per hour Completion Time is deemed appropriate.

SURVEILLANCE REQUIREMENTS

SR 3.9.9.1

This Surveillance demonstrates that one required RHR shutdown cooling subsystem is in operation and circulating reactor coolant. The required flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability.

The Frequency of 12 hours is sufficient in view of other visual and audible indications available to the operator for monitoring the RHR subsystems in the control room.

REFERENCES

None.

## 3.4 REACTOR COOLANT SYSTEM (RCS)

### 3.4.10 Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown

LCO 3.4.10 Two RHR shutdown cooling subsystems shall be OPERABLE, and, with no recirculation pump in operation, at least one RHR shutdown cooling subsystem shall be in operation.

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

1. Both RHR shutdown cooling subsystems and recirculation pumps may be removed from operation provided RCS temperature is ≤ [200]°F~~for up to 2 hours per 8 hour period~~.

2. One RHR shutdown cooling subsystem may be inoperable for up to 2 hours for the performance of Surveillances.

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APPLICABILITY: MODE 4.

ACTIONS

----------NOTE----------

Separate Condition entry is allowed for each RHR shutdown cooling subsystem.

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| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. One or two RHR shutdown cooling subsystems inoperable. | A.1 Verify an alternate method of decay heat removal is available for each inoperable RHR shutdown cooling subsystem. | 1 hour<br><br>AND<br><br>Once per 24 hours thereafter |

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| B. No RHR shutdown cooling subsystem in operation.<br><br>AND<br><br>No recirculation pump in operation. | B.1 Verify reactor coolant circulating by an alternate method.<br><br>AND<br><br>B.2 Monitor reactor coolant temperature and pressure. | 1 hour from discovery of no reactor coolant circulation<br><br>AND<br><br>Once per 12 hours thereafter<br><br>Once per hour |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.4.10.1 | Verify one required RHR shutdown cooling subsystem or recirculation pump is operating. | 12 hours |

3.9 REFUELING OPERATIONS

3.9.8 Residual Heat Removal (RHR) - High Water Level

LCO 3.9.8 One RHR shutdown cooling subsystem shall be OPERABLE and in operation.

----------NOTE----------
The required RHR shutdown cooling subsystem may be removed from operation provided RCS temperature is ≤ [200]°F ~~for up to 2 hours per 8 hour period~~.
---

APPLICABILITY: MODE 5 with irradiated fuel in the reactor pressure vessel (RPV) and with the water level ≥ [22 ft 8 inches] above the top of the [RPV flange].

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| A. Required RHR shutdown cooling subsystem inoperable. | A.1 | Verify an alternate method of decay heat removal is available. | 1 hour<br><br>AND<br><br>Once per 24 hours thereafter |
| B. Required Action and associated Completion Time of Condition A not met. | B.1 | Suspend loading irradiated fuel assemblies into the RPV. | Immediately |
| | AND | | |
| | B.2 | Initiate action to restore [primary or secondary] containment to OPERABLE status. | Immediately |
| | AND | | |

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| | B.3 Initiate action to restore one standby gas treatment subsystem to OPERABLE status.<br><br>AND | Immediately |
| | B.4 Initiate action to restore isolation capability in each required secondary containment penetration flow path not isolated. | Immediately |
| C. No RHR shutdown cooling subsystem in operation. | C.1 Verify reactor coolant circulation by an alternate method.<br><br>AND | 1 hour from discovery of no reactor coolant circulation<br><br>AND<br><br>Once per 12 hours thereafter |
| | C.2 Monitor reactor coolant temperature. | Once per hour |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.9.8.1 | Verify one required RHR shutdown cooling subsystem is operating. | 12 hours |

3.9 REFUELING OPERATIONS

3.9.9 Residual Heat Removal (RHR) - Low Water Level

LCO 3.9.9 Two RHR shutdown cooling subsystems shall be OPERABLE, and one RHR shutdown cooling subsystem shall be in operation.

----------NOTE----------
The required operating shutdown cooling subsystem may be removed from operation provided RCS temperature is ≤ [200]°F~~for up to 2 hours per 8 hour period~~.
---

APPLICABILITY: MODE 5 with irradiated fuel in the reactor pressure vessel (RPV) and with the water level < [23] ft above the top of the [RPV flange].

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. One or two RHR shutdown cooling subsystems inoperable. | A.1 Verify an alternate method of decay heat removal is available for each inoperable RHR shutdown cooling subsystem. | 1 hour<br><br>AND<br><br>Once per 24 hours thereafter |
| B. Required Action and associated Completion Time of Condition A not met. | B.1 Initiate action to restore [primary or secondary] containment to OPERABLE status.<br><br>AND<br><br>B.2 Initiate action to restore one standby gas treatment subsystem to OPERABLE status.<br><br>AND | Immediately<br><br><br><br><br>Immediately |

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| | B.3 Initiate action to restore isolation capability in each required secondary containment penetration flow path not isolated. | Immediately |
| C. No RHR shutdown cooling subsystem in operation. | C.1 Verify reactor coolant circulation by an alternate method.<br><br>AND<br><br>C.2 Monitor reactor coolant temperature. | 1 hour from discovery of no reactor coolant circulation<br><br>AND<br><br>Once per 12 hours thereafter<br><br>Once per hour |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.9.9.1 | Verify one required RHR shutdown cooling subsystem is operating. | 12 hours |

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.10 Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown

BASES

| | |
|---|---|
| BACKGROUND | Irradiated fuel in the shutdown reactor core generates heat during the decay of fission products and increases the temperature of the reactor coolant. This decay heat must be removed to maintain the temperature of the reactor coolant at ≤ 200°F. This decay heat removal is in preparation for performing refueling or maintenance operations, or for keeping the reactor in the Cold Shutdown condition.<br><br>The two redundant, manually controlled shutdown cooling subsystems of the RHR System provide decay heat removal. Each loop consists of a motor driven pump, two heat exchangers in series, and associated piping and valves. Both loops have a common suction from the same recirculation loop. Each pump discharges the reactor coolant, after circulation through the respective heat exchanger, to the reactor via separate feedwater lines or to the reactor via the LPCI injection path. The RHR heat exchangers transfer heat to the Standby Service Water System. |
| APPLICABLE SAFETY ANALYSES | Decay heat removal by the RHR System in the shutdown cooling mode is not required for mitigation of any event or accident evaluated in the safety analyses. Decay heat removal is, however, an important safety function that must be accomplished or core damage could result. The RHR Shutdown Cooling System satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii). |
| LCO | Two RHR shutdown cooling subsystems are required to be OPERABLE, and, when no recirculation pump is in operation, one RHR shutdown cooling subsystem ~~must~~ is required to be in operation. An OPERABLE RHR shutdown cooling subsystem consists of one OPERABLE RHR pump, two heat exchangers in series, and the associated piping and valves. Each shutdown cooling subsystem is considered OPERABLE if it can be manually aligned (remote or local) in the shutdown cooling mode for removal of decay heat. In MODE 4, one RHR shutdown cooling subsystem can provide the required cooling, but two subsystems are required to be OPERABLE to provide redundancy. Operation of one subsystem can maintain and reduce the reactor coolant temperature as required. ~~However, to ensure adequate core flow to allow for accurate average reactor coolant temperature monitoring, nearly continuous operation is required.~~ |

BASES

LCO (continued)

Note 1 permits both RHR shutdown cooling subsystems and recirculation pumps to be removed from operation ~~for a period of 2 hours in an 8 hour period~~ provided RCS temperature is ≤ [200]°F. This is permitted because natural circulation is often sufficient to maintain RCS temperature without an RHR shutdown cooling subsystem in operation.

---------- Reviewer's Note ----------
The [200]°F temperature used in the Note should be the same temperature used for MODE 3 to MODE 4 transition in Table 1.1-1.
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~~.~~ Note 2 allows one RHR shutdown cooling subsystem to be inoperable for up to 2 hours for performance of surveillance tests. These tests may be on the affected RHR System or on some other plant system or component that necessitates placing the RHR System in an inoperable status during the performance. This is permitted because the core heat generation can be low enough and the heatup rate slow enough to allow some changes to the RHR subsystems or other operations requiring RHR flow interruption and loss of redundancy.

APPLICABILITY

In MODE 4, the RHR System may be operated in the shutdown cooling mode to remove decay heat to maintain coolant temperature below 200°F. Otherwise, a recirculation pump is required to be in operation.

In MODES 1 and 2, and in MODE 3 with reactor steam dome pressure greater than or equal to the RHR cut in permissive pressure, this LCO is not applicable. Operation of the RHR System in the shutdown cooling mode is not allowed above this pressure because the RCS pressure may exceed the design pressure of the shutdown cooling piping. Decay heat removal at reactor pressures greater than or equal to the RHR cut in permissive pressure is typically accomplished by condensing the steam in the main condenser. Additionally, in MODE 2 below this pressure, the OPERABILITY requirements for the Emergency Core Cooling Systems (ECCS) (LCO 3.5.1, "ECCS - Operating") do not allow placing the RHR shutdown cooling subsystem into operation.

The requirements for decay heat removal in MODE 3 below the cut in permissive pressure and in MODE 5 are discussed in LCO 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System - Hot Shutdown," LCO 3.9.8, "Residual Heat Removal (RHR) - High Water Level," and LCO 3.9.9, "Residual Heat Removal (RHR) - Low Water Level."

ACTIONS

A Note has been provided to modify the ACTIONS related to RHR shutdown cooling subsystems. Section 1.3, Completion Times, specifies once a Condition has been entered, subsequent divisions, subsystems,

BASES

| | |
|---|---|
| SURVEILLANCE REQUIREMENTS | SR 3.4.10.1<br><br>This Surveillance verifies that one required RHR shutdown cooling subsystem or recirculation pump is in operation and circulating reactor coolant. The required flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability. The Frequency of 12 hours is sufficient in view of other visual and audible indications available to the operator for monitoring the RHR subsystem in the control room. |
| REFERENCES | None. |

BASES

LCO (continued)

Additionally, each RHR shutdown cooling subsystem is considered OPERABLE if it can be manually aligned (remote or local) in the shutdown cooling mode for removal of decay heat. Operation (either continuous or intermittent) of one subsystem can maintain and reduce the reactor coolant temperature as required. ~~However, to ensure adequate core flow to allow for accurate average reactor coolant temperature monitoring, nearly continuous operation is required.~~ A Note is provided to allow ~~a 2 hour exception for~~ the operating subsystem to be removed from operation ~~every 8 hours.~~ provided RCS temperature is ≤ [200]°F. This is permitted because natural circulation is often sufficient to maintain RCS temperature without an RHR shutdown cooling subsystem in operation.

---------- Reviewer's Note ----------
The [200]°F temperature used in the Note should be the same temperature used for MODE 3 to MODE 4 transition in Table 1.1-1.
----------

APPLICABILITY

One RHR shutdown cooling subsystem must be OPERABLE in MODE 5, with irradiated fuel in the RPV and with the water level ≥ [22 ft 8 inches] above the top of the RPV flange, to provide decay heat removal. RHR System requirements in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS); Section 3.5, Emergency Core Cooling Systems (ECCS) and Reactor Core Isolation Cooling (RCIC) System; and Section 3.6, Containment Systems. RHR Shutdown Cooling System requirements in MODE 5, with irradiated fuel in the reactor pressure vessel and with the water level < [22 ft 8 inches] above the RPV flange, are given in LCO 3.9.9, "Residual Heat Removal (RHR) - Low Water Level."

ACTIONS

A.1

With no RHR shutdown cooling subsystem OPERABLE, an alternate method of decay heat removal must be established within 1 hour. In this condition, the volume of water above the RPV flange provides adequate capability to remove decay heat from the reactor core. However, the overall reliability is reduced because loss of water level could result in reduced decay heat removal capability. The 1 hour Completion Time is based on the decay heat removal function and the probability of a loss of the available decay heat removal capabilities. Furthermore, verification of the functional availability of these alternate method(s) must be reconfirmed every 24 hours thereafter. This will ensure continued heat removal capability.

Alternate decay heat removal methods are available to the operators for review and preplanning in the unit's Operating Procedures. For example,

BASES

| | |
|---|---|
| SURVEILLANCE REQUIREMENTS | SR 3.9.8.1<br><br>This Surveillance demonstrates that the required RHR subsystem is in operation and circulating reactor coolant. The required flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability. The Frequency of 12 hours is sufficient in view of other visual and audible indications available to the operator for monitoring the RHR subsystem in the control room. |
| REFERENCES | None. |

B 3.9 REFUELING OPERATIONS

B 3.9.9 Residual Heat Removal (RHR) - Low Water Level

BASES

| | |
|---|---|
| BACKGROUND | The purpose of the RHR System in MODE 5 is to remove decay heat and sensible heat from the reactor coolant, as required by GDC 34. Each of the two shutdown cooling loops of the RHR System can provide the required decay heat removal. Each loop consists of one motor driven pump, a heat exchanger, and associated piping and valves. Both loops have a common suction from the same recirculation loop. Each pump discharges the reactor coolant, after it has been cooled by circulation through the respective heat exchangers, to the reactor via separate feedwater lines, to the upper containment pool via a common single flow distribution sparger, or to the reactor via the low pressure coolant injection path. The RHR heat exchangers transfer heat to the Standby Service Water System. The RHR shutdown cooling mode is manually controlled. |
| APPLICABLE SAFETY ANALYSES | With the unit in MODE 5, the RHR System is not required to mitigate any events or accidents evaluated in the safety analyses. The RHR System is required for removing decay heat to maintain the temperature of the reactor coolant.<br><br>The RHR System satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii). |
| LCO | In MODE 5 with irradiated fuel in the reactor pressure vessel (RPV) and with the water level < 22 ft 8 inches above the RPV flange both RHR shutdown cooling subsystems must be OPERABLE.<br><br>An OPERABLE RHR shutdown cooling subsystem consists of an RHR pump, a heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path.<br><br>Additionally, each RHR shutdown cooling subsystem is considered OPERABLE if it can be manually aligned (remote or local) in the shutdown cooling mode for removal of decay heat. Operation (either continuous or intermittent) of one subsystem can maintain and reduce the reactor coolant temperature as required. ~~However, to ensure adequate core flow to allow for accurate average reactor coolant temperature monitoring, nearly continuous operation is required.~~ A Note is provided to allow ~~a 2 hour exception for~~ the operating subsystem to be removed from operation ~~every 8 hours.~~provided RCS temperature is ≤ [200]°F. This is permitted because natural circulation is often sufficient to maintain RCS temperature without an RHR shutdown cooling subsystem in operation.<br><br>---------- Reviewer's Note ---------- |

The [200]°F temperature used in the Note should be the same temperature used for MODE 3 to MODE 4 transition in Table 1.1-1.

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BASES

ACTIONS (continued)

administrative controls to assure isolation capability) in each associated penetration not isolated that is assumed to be isolated to mitigate radioactivity releases. This may be performed as an administrative check, by examining logs or other information to determine whether the components are out of service for maintenance or other reasons. It is not necessary to perform the Surveillances needed to demonstrate the OPERABILITY of the components. If, however, any required component is inoperable, then it must be restored to OPERABLE status. In this case, a surveillance may need to be performed to restore the component to OPERABLE status. Actions must continue until all required components are OPERABLE.

C.1 and C.2

If no RHR shutdown cooling subsystem is in operation, an alternate method of coolant circulation is required to be established within 1 hour. The Completion Time is modified such that the 1 hour is applicable separately for each occurrence involving a loss of coolant circulation.

During the period when the reactor coolant is being circulated by an alternate method (other than by the required RHR Shutdown Cooling System), the reactor coolant temperature must be periodically monitored to ensure proper function of the alternate method. The once per hour Completion Time is deemed appropriate.

SURVEILLANCE REQUIREMENTS

SR 3.9.9.1

This Surveillance demonstrates that one required RHR shutdown cooling subsystem is in operation and circulating reactor coolant. The required flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability. The Frequency of 12 hours is sufficient in view of other visual and audible indications available to the operator for monitoring the RHR subsystem in the control room.

REFERENCES None.