













The proposed change provides a TS exception to entering Mode 4 if both required RHR shutdown cooling subsystems are inoperable. The RHR System in the shutdown cooling mode performs the important safety function of removing decay heat from the reactor coolant system during shutdown. The RHR System in the shutdown cooling mode is not an initiator of any accident previously evaluated or assumed to mitigate any accident previously evaluated. The design and function of the RHR System are not affected by the proposed change.

The proposed change would also exempt entering Mode 4 if both required RHR shutdown cooling subsystems are inoperable and other operating modes of the RHR System are inoperable, such as Low Pressure Core Injection (LPCI) and RHR suppression pool cooling, and both subsystems of the support system for the RHR System heat exchangers, the Standby Service Water (SSW) System, are inoperable. The TS for those RHR operating modes and the SSW System require entering Mode 4 when both required subsystems are inoperable. Those operating modes and systems are not initiators to any accident previously evaluated but are used to mitigate the consequences of an accident previously evaluated. However, the consequences of an accident previously evaluated resulting from remaining in Mode 3 versus Mode 4 when RHR shutdown cooling subsystems are inoperable are not significantly increased because there would be no dependable method to remove post-accident decay heat in Mode 4 if both required RHR shutdown cooling subsystems are inoperable.

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

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

Response: No

The proposed change provides a TS exception to entering Mode 4 if both required RHR shutdown cooling subsystems are inoperable. The proposed change does not affect the design function or operation of the RHR System or the SSW System. No new equipment is being installed as a result of the proposed change. The proposed change affects the actions taken when both required RHR shutdown cooling subsystems are inoperable, so no new failure mechanisms are created.

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

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

Response: No

The proposed change provides a TS exception to entering Mode 4 if both required RHR shutdown cooling subsystems are inoperable. The proposed change does not change any specific values or controlling parameters that define margin in the design or licensing basis. No safety limits are affected by the proposed change. The proposed change applies when both required RHR shutdown cooling subsystems are inoperable, so no design or safety limits associated with the operation of the RHR System are affected.

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

Based upon the reasoning presented above, Entergy concludes that the requested change involves no significant hazards consideration, as set forth in 10 CFR 50.92(c), "Issuance of Amendment."

### 3.2 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

## 4.0 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 Part 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.

## 5.0 REFERENCES

1. NRC letter to TSTF – "Final Safety Evaluations of Technical Specification Task Force Traveler TSTF 580, Revision 1, "Provide Exception from Entering MODE 4 with No Operable RHR Shutdown Cooling," (EPIC L-2020-PMP-0012,) (ML21188A283,) dated July 11, 2021
2. NRC letter to Entergy – "Grand Gulf Nuclear Station, Unit 1 and River Bend Station, Unit 1 – Issuance of Amendments Re: Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-566, Revision 0, "Revise Actions For Inoperable RHR Shutdown Cooling Subsystems" (EPID L-2020-LLA-0010)," (ML21011A048,) dated February 1, 2021

## 6.0 ATTACHMENTS

- 1.a. Technical Specification Page Markups, Grand Gulf Nuclear Station, Unit 1
- 1.b. Technical Specification Page Markups, River Bend Station, Unit 1
- 2.a. Retyped Technical Specification Pages, Grand Gulf Nuclear Station, Unit 1
- 2.b. Retyped Technical Specification Pages, River Bend Station, Unit 1



- 3.a. Markup of Technical Specification Bases Pages (For Information Only),  
Grand Gulf Nuclear Station, Unit 1
- 3.b. Markup of Technical Specification Bases Pages (For Information Only),  
River Bend Station, Unit 1

**Enclosure, Attachment 1.a**

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**Technical Specification Page Markups, Grand Gulf Nuclear Station, Unit 1**

(3 pages)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Residual Heat Removal (RHR) Shutdown Cooling System — Hot 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 not be in operation for up to 2 hours per 8 hour period.
  2. One RHR shutdown cooling subsystem may be inoperable for up to 2 hours for performance of Surveillances.
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APPLICABILITY: MODE 3 with reactor steam dome pressure less than the RHR cut in permissive pressure.

ACTIONS

-----NOTE-----

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

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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to restore RHR shutdown cooling subsystem <del>(s)</del> to OPERABLE status.	Immediately
C. Two RHR shutdown cooling subsystems inoperable.	C.1 Verify an alternate method of decay heat removal is available for each inoperable RHR shutdown cooling subsystem.	1 hour <u>AND</u> Once per 24 hours thereafter
D. Required Action and associated Completion Time of Condition C not met.	<p>-----NOTE-----                      LCO 3.0.3 and all other LCO Required Actions requiring a MODE change to MODE 4 may be suspended until one RHR shutdown cooling subsystem is restored to OPERABLE status.                      -----</p> <p>D.1 Initiate action to restore one RHR shutdown cooling subsystem to OPERABLE status.</p>	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p><b>EG.</b> No RHR shutdown cooling subsystem in operation.</p> <p><u>AND</u></p> <p>No recirculation pump in operation.</p>	<p><b>EG.1</b> Initiate action to restore one RHR shutdown cooling subsystem or one recirculation pump to operation.</p>	<p>Immediately</p>
	<p><u>AND</u></p> <p><b>EG.2</b> Verify reactor coolant circulation by an alternate method.</p>	<p>1 hour from discovery of no reactor coolant circulation</p> <p><u>AND</u></p> <p>Once per 12 hours thereafter</p>
	<p><u>AND</u></p> <p><b>EG.3</b> Monitor reactor coolant temperature and pressure.</p>	<p>Once per hour</p>

**Enclosure, Attachment 1.b**

**CNRO-2022-00015**

**Technical Specification Page Markups, River Bend Station, Unit 1**

(3 pages)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Residual Heat Removal (RHR) Shutdown Cooling System–Hot 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 for up to 2 hours per 8 hour period.
  2. One RHR shutdown cooling subsystem may be inoperable for up to 2 hours for performance of Surveillances.
- 

APPLICABILITY: MODE 3 with reactor steam dome pressure less than the RHR cut in permissive pressure.

ACTIONS

-----NOTE-----  
Separate Condition entry is allowed for each RHR shutdown cooling subsystem.  
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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One <del>or two</del> RHR shutdown cooling subsystems inoperable.	A.1 Verify an alternate method of decay heat removal is available <del>for each inoperable RHR shutdown cooling subsystem.</del>	1 hour <u>AND</u> Once per 24 hours thereafter

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to restore RHR shutdown cooling subsystem <del>(s)</del> to OPERABLE status.	Immediately
C. Two RHR shutdown cooling subsystems inoperable.	C.1 Verify an alternate method of decay heat removal is available for each inoperable RHR shutdown cooling subsystem.	1 hour <u>AND</u> Once per 24 hours thereafter
D. Required Action and associated Completion Time of Condition C not met.	<p>-----NOTE-----                      LCO 3.0.3 and all other LCO Required Actions requiring a MODE change to MODE 4 may be suspended until one RHR shutdown cooling subsystem is restored to OPERABLE status.                      -----</p> <p>D.1 Initiate action to restore one RHR shutdown cooling subsystem to OPERABLE status.</p>	Immediately

(continued)



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p><del>EG.</del> No RHR shutdown cooling subsystem in operation.</p> <p><u>AND</u></p> <p>No recirculation pump in operation.</p>	<p><del>EG.</del>1 Initiate action to restore one RHR shutdown cooling subsystem or one recirculation pump to operation.</p> <p><u>AND</u></p> <p><del>EG.</del>2 Verify reactor coolant circulation by an alternate method.</p> <p><u>AND</u></p> <p><del>EG.</del>3 Monitor reactor coolant temperature and pressure.</p>	<p>Immediately</p> <p>1 hour from discovery of no reactor coolant circulation</p> <p><u>AND</u></p> <p>Once per 12 hours thereafter</p> <p>Once per hour</p>

**Enclosure, Attachment 2.a**

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**Retyped Technical Specification Pages, Grand Gulf Nuclear Station, Unit 1**

(3 pages to follow)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Residual Heat Removal (RHR) Shutdown Cooling System — Hot 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 not be in operation for up to 2 hours per 8 hour period.
  2. One RHR shutdown cooling subsystem may be inoperable for up to 2 hours for performance of Surveillances.
- 

APPLICABILITY: MODE 3 with reactor steam dome pressure less than the RHR cut in permissive pressure.

ACTIONS

-----NOTE-----

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

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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RHR shutdown cooling subsystem inoperable.	A.1 Verify an alternate method of decay heat removal is available.	1 hour <u>AND</u> Once per 24 hours thereafter

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to restore RHR shutdown cooling subsystem to OPERABLE status.	Immediately
C. Two RHR shutdown cooling subsystems inoperable.	C.1 Verify an alternate method of decay heat removal is available for each inoperable RHR shutdown cooling subsystem.	1 hour <u>AND</u> Once per 24 hours thereafter
D. Required Action and associated Completion Time of Condition C not met.	<p>-----NOTE-----                      LCO 3.0.3 and all other LCO Required Actions requiring a MODE change to MODE 4 may be suspended until one RHR shutdown cooling subsystem is restored to OPERABLE status.                      -----</p> <p>D.1 Initiate action to restore one RHR shutdown cooling subsystem to OPERABLE status.</p>	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. No RHR shutdown cooling subsystem in operation.  <u>AND</u>  No recirculation pump in operation.	E.1 Initiate action to restore one RHR shutdown cooling subsystem or one recirculation pump to operation.	Immediately
	<u>AND</u>  E.2 Verify reactor coolant circulation by an alternate method.	1 hour from discovery of no reactor coolant circulation  <u>AND</u> Once per 12 hours thereafter
	<u>AND</u>  E.3 Monitor reactor coolant temperature and pressure.	Once per hour

**Enclosure, Attachment 2.b**

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**Retyped Technical Specification Pages, River Bend Station, Unit 1**

(3 pages to follow)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Residual Heat Removal (RHR) Shutdown Cooling System–Hot 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 for up to 2 hours per 8 hour period.
  2. One RHR shutdown cooling subsystem may be inoperable for up to 2 hours for performance of Surveillances.
- 

APPLICABILITY: MODE 3 with reactor steam dome pressure less than the RHR cut in permissive pressure.

ACTIONS

-----NOTE-----

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

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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RHR shutdown cooling subsystem inoperable.	A.1 Verify an alternate method of decay heat removal is available.	1 hour <u>AND</u> Once per 24 hours thereafter

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to restore RHR shutdown cooling subsystem to OPERABLE status.	Immediately
C. Two RHR shutdown cooling subsystems inoperable.	C.1 Verify an alternate method of decay heat removal is available for each inoperable RHR shutdown cooling subsystem.	1 hour <u>AND</u> Once per 24 hours thereafter
D. Required Action and associated Completion Time of Condition C not met.	<p>-----NOTE-----                      LCO 3.0.3 and all other LCO Required Actions requiring a MODE change to MODE 4 may be suspended until one RHR shutdown cooling subsystem is restored to OPERABLE status.                      -----</p> <p>D.1 Initiate action to restore one RHR shutdown cooling subsystem to OPERABLE status.</p>	Immediately

(continued)



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. No RHR shutdown cooling subsystem in operation.  <u>AND</u>  No recirculation pump in operation.	E.1 Initiate action to restore one RHR shutdown cooling subsystem or one recirculation pump to operation.	Immediately
	<u>AND</u>	
	E.2 Verify reactor coolant circulation by an alternate method.	1 hour from discovery of no reactor coolant circulation  <u>AND</u> Once per 12 hours thereafter
<u>AND</u>		
E.3 Monitor reactor coolant temperature and pressure.	Once per hour	

**Enclosure, Attachment 3.a**

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(4 pages to follow)

BASES

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APPLICABILITY  
(continued)

shutdown cooling mode to remove decay heat to reduce or maintain coolant temperature. Otherwise, a recirculation pump is required to be in operation.

The requirements for decay heat removal in MODES 4 and 5 are discussed in LCO 3.4.10, "Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown"; LCO 3.9.8, "Residual Heat Removal (RHR) - High Water Level"; and LCO 3.9.9, "Residual Heat Removal (RHR) - Low Water Level."

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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, components or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable shutdown cooling subsystems provide appropriate compensatory measures for separate inoperable shutdown cooling subsystems. As such, a Note has been provided that allows separate Condition entry for each inoperable RHR shutdown cooling subsystem.

A.1

With one required RHR shutdown cooling subsystem inoperable for decay heat removal, except as permitted by LCO Note 2, the overall reliability is reduced, however, because a single failure in the OPERABLE subsystem could result in reduced RHR shutdown cooling capability. Therefore an alternate method of decay heat removal must be provided.

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(continued)

NO CHANGES ON THIS PAGE, FOR INFORMATION ONLY

BASES

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ACTIONS

A.1 (continued)

~~With both 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 these alternate methods(s) must be reconfirmed every 24 hours thereafter. This will provide assurance of continued heat removal capability.~~

The required cooling capacity of the alternate method should be sufficient to maintain or reduce temperature. Decay heat removal by ambient losses can be considered as contributing to the alternate method capability. Alternate methods that can be used include (but are not limited to) ~~the Spent Fuel Pool Cooling System~~ the Reactor Water Cleanup System, or an inoperable but functional RHR shutdown cooling subsystem.

B.1

If the required alternate method(s) of decay heat removal cannot be verified within one hour, immediate action must be taken to restore the inoperable RHR shutdown cooling subsystem(s) to operable status. The Required Action will restore redundant decay heat removal paths. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

C.1

With both 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 these alternate method(s) must be reconfirmed every 24 hours thereafter. This will provide assurance of continued heat removal capability.

The required cooling capacity of the alternate method should be sufficient to maintain or reduce temperature. Decay heat removal by ambient losses can be considered as, or contributing to, the alternate method capability. Alternate methods that can be used include (but are not

limited to) the Reactor Water Cleanup System, or an inoperable but functional RHR shutdown cooling subsystem.

#### D.1

If the required alternate methods of decay heat removal cannot be verified within one hour, immediate action must be taken to restore at least one RHR shutdown cooling subsystem to OPERABLE status. The immediate Completion Time reflects the importance of restoring a method of heat removal.

Required Action D.1 is modified by a Note indicating that all required MODE changes to MODE 4 may be suspended until one RHR shutdown cooling subsystem is restored to OPERABLE status. In this case, LCO 3.0.3 and other Required Actions directing entry into MODE 4 could force the unit into a less safe condition in which there may be no adequate means to remove decay heat. It is more appropriate to allow the restoration of one of the RHR shutdown cooling subsystems before requiring entry into a condition in which that subsystem would be needed and exiting a condition where other sources of cooling are available. When at least one RHR subsystem is restored to OPERABLE status, the Completion Times of LCO 3.0.3 or other Required Actions resume at the point at which they were suspended.

#### GE.1, GE.2, and GE.3

With no RHR shutdown cooling subsystem and no recirculation pump in operation, except as is permitted by LCO Note 1, reactor coolant circulation by the RHR shutdown cooling subsystem or one recirculation pump must be restored without delay.

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

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(continued)

BASES

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ACTIONS GE.1, GE.2, and GE.3 (continued)

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.

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SURVEILLANCE  
REQUIREMENTS

SR 3.4.9.1

This Surveillance verifies that one 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 Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

This Surveillance is modified by a Note allowing sufficient time to align the RHR System for shutdown cooling operation after clearing the pressure interlock that isolates the system, or for placing a recirculation pump in operation. The Note takes exception to the requirements of the Surveillance being met (i.e., forced coolant circulation is not required for this initial 2 hour period), which also allows entry into the Applicability of this Specification in accordance with SR 3.0.4 since the Surveillance will not be "not met" at the time of entry into the Applicability.

SR 3.4.9.2

RHR Shutdown Cooling System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the RHR shutdown cooling system subsystems and may also prevent water hammer, pump cavitation, and pumping of noncondensable gas into the reactor vessel.

Selection of RHR Shutdown Cooling System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of

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**Enclosure, Attachment 3.b**

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APPLICABILITY (continued)      The requirements for decay heat removal in MODES 4 and 5 are discussed in LCO 3.4.10, "Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown"; LCO 3.9.8, "Residual Heat Removal (RHR) - High Water Level"; and LCO 3.9.9, "Residual Heat Removal (RHR) - Low Water Level."

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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, components or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable shutdown cooling subsystems provide appropriate compensatory measures for separate inoperable shutdown cooling subsystems. As such, a Note has been provided that allows separate Condition entry for each inoperable RHR shutdown cooling subsystem.

A.1

With one required RHR shutdown cooling subsystem inoperable for decay heat removal, except as permitted by LCO Note 2, the overall reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced RHR shutdown cooling capability. Therefore, an alternate method of decay heat removal must be provided.

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BASES

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ACTIONS

A.1 (continued)

~~With both 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 these alternate method(s) must be reconfirmed every 24 hours thereafter. This will provide assurance of continued heat removal capability.~~

The required cooling capacity of the alternate method should be sufficient to maintain or reduce temperature. Decay heat removal by ambient losses can be considered as, or contributing to the alternate method capability. Alternate methods that can be used include (but are not limited to) ~~the Control Rod Drive System~~, the Reactor Water Cleanup System, or an inoperable but functional RHR shutdown cooling system.

B.1

If the required alternate method(s) of decay heat removal cannot be verified within one hour, immediate action must be taken to restore the inoperable RHR shutdown cooling subsystem(s) to operable status. The Required Action will restore redundant decay heat removal paths. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

C.1

With both 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 these alternate method(s) must be reconfirmed every 24 hours thereafter. This will provide assurance of continued heat removal capability.

The required cooling capacity of the alternate method should be sufficient to maintain or reduce temperature. Decay heat removal by ambient

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BASES

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ACTIONS

C.1 (continued)

losses can be considered as, or contributing to, the alternate method capability. Alternate methods that can be used include (but are not limited to) the Reactor Water Cleanup System, or an inoperable but functional RHR shutdown cooling subsystem.

D.1

If the required alternate methods of decay heat removal cannot be verified within one hour, immediate action must be taken to restore at least one RHR shutdown cooling subsystem to OPERABLE status. The immediate Completion Time reflects the importance of restoring a method of heat removal.

Required Action D.1 is modified by a Note indicating that all required MODE changes to MODE 4 may be suspended until one RHR shutdown cooling subsystem is restored to OPERABLE status. In this case, LCO 3.0.3 and other Required Actions directing entry into MODE 4 could force the unit into a less safe condition in which there may be no adequate means to remove decay heat. It is more appropriate to allow the restoration of one of the RHR shutdown cooling subsystems before requiring entry into a condition in which that subsystem would be needed and exiting a condition where other sources of cooling are available. When at least one RHR subsystem is restored to OPERABLE status, the Completion Times of LCO 3.0.3 or other Required Actions resume at the point at which they were suspended.

EG.1, EG.2, and EG.3

With no RHR shutdown cooling subsystem and no recirculation pump in operation, except as is permitted by LCO Note 1, reactor coolant circulation by the RHR shutdown cooling subsystem or one recirculation pump must be restored without delay.

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.

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BASES

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ACTIONS

~~EG.1, EG.2, and EG.3~~ (continued)

During the period when the reactor coolant is being circulated by an alternate method (other than by the required RHR shutdown cooling subsystem 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.

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SURVEILLANCE  
REQUIREMENTS

SR 3.4.9.1

This Surveillance verifies that one 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 Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

This Surveillance is modified by a Note allowing sufficient time to align the RHR System for shutdown cooling operation after clearing the pressure interlock that isolates the system, or for placing a recirculation pump in operation. The Note takes exception to the requirements of the Surveillance being met (i.e., forced coolant circulation is not required for this initial 2 hour period), which also allows entry into the Applicability of this Specification in accordance with SR 3.0.4 since the Surveillance will not be "not met" at the time of entry into the Applicability.

SR 3.4.9.2

RHR Shutdown Cooling System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the RHR shutdown cooling subsystems and may also prevent water hammer, pump cavitation, and pumping of noncondensable gas into the reactor vessel.

Selection of RHR Shutdown Cooling System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration.

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