

Technical Requirements Manual

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TRM 1.0 USE AND APPLICATION

TRM 1.1 Definitions

- NOTE -

1. Technical Requirements (TR) Definitions follow those terms defined in Technical Specifications (TS) Section 1.1. Only definitions specific to the TRM will be defined in this section.
2. The defined terms appear in capitalized type and are applicable throughout the TRM.
3. When a term is defined in both the TS and the TRM, the TRM definition takes precedence within the TRM.
4. When a term defined in TS Section 1.1 refers to "OPERABLE" or "OPERABILITY" its use within the TRM is understood to apply the TRM requirement-specific defined terms (i.e., FUNCTIONAL or FUNCTIONALITY) as required in each Technical Requirement.

<u>Term</u>	<u>Definition</u>
ACTIONS	ACTIONS shall be that part of a Technical Requirement that prescribes Required Actions to be taken under designated Conditions within specified Completion Times.
FUNCTIONAL - FUNCTIONALITY	A system, subsystem, train, component, or device shall be FUNCTIONAL or have FUNCTIONALITY when it is capable of performing its specified function(s), as set forth in the current licensing basis and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified function(s) are also capable of performing their related support function(s).

TRM 1.0 USE AND APPLICATION

TRM 1.2 Logical Connectors

Logical Connectors are discussed in Technical Specification Section 1.2 and are applicable throughout the Technical Requirements Manual (TRM). When TS Section 1.2 refers to “OPERABLE” or “OPERABILITY” its use as applied to the TRM is understood to apply the TRM requirement-specific defined terms (i.e., FUNCTIONAL or FUNCTIONALITY) as required in each Technical Requirement.

TRM 1.0 USE AND APPLICATION

TRM 1.3 Completion Times

Completion Times are discussed in Technical Specification Section 1.3 and are applicable throughout the Technical Requirements Manual (TRM). When TS Section 1.3 refers to “OPERABLE” or “OPERABILITY” its use as applied to the TRM is understood to apply the TRM requirement-specific defined terms (i.e., FUNCTIONAL or FUNCTIONALITY) as required in each Technical Requirement. Similarly, when TS Section 1.3 refers to an “LCO” its use as applied to the TRM is understood to apply to Technical Requirements (TRs).

TRM 1.0 USE AND APPLICATION

TRM 1.4 Frequency

Frequency is discussed in Technical Specification Section 1.4 and is applicable throughout the Technical Requirements Manual (TRM). When TS Section 1.4 refers to “OPERABLE” or “OPERABILITY” its use as applied to the TRM is understood to apply the TRM requirement-specific defined terms (i.e., FUNCTIONAL or FUNCTIONALITY) as required in each Technical Requirement. Similarly, when TS Section 1.4 refers to an “LCO” its use as applied to the TRM is understood to apply to Technical Requirements (TRs). TS Section 1.4 references to LCO 3.0.4 and SR 3.0.4 are not applicable to the TRM.

TRM 3.0 TECHNICAL REQUIREMENT (TR) APPLICABILITY

TR 3.0.1 Each TR shall be met during the MODES or other specified conditions in the Applicability, except as provided in TR 3.0.2.

TR 3.0.2 Upon discovery of a failure to meet a TR, the Required Actions of the associated Conditions shall be met.

 If the TR is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required, unless otherwise stated.

TR 3.0.3 When a TR is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS:

- a. Initiate action to restore compliance with the TR or associated ACTIONS immediately;
- b. Initiate action to assess and manage the risk of the resulting unit configuration immediately, and

- NOTE -

TR 3.0.3.c shall be completed if TR 3.0.3 is entered.

- c. Enter the circumstances of entry into TR 3.0.3 into the Corrective Action Program within 24 hours.

TRM 3.0 TECHNICAL REQUIREMENT SURVEILLANCE (TRS) APPLICABILITY

TRS 3.0.1 TRSs shall be met during the MODES or other specified conditions in the Applicability for the individual TR, unless otherwise stated in the TRS. Failure to meet a TRS, whether such failure is experienced during the performance of the TRS or between performances of the TRS, shall be failure to meet the TR. Failure to perform a TRS within the specified Frequency shall be failure to meet the TR. TRSs do not have to be performed on nonfunctional equipment or variables outside specified limits.

TRS 3.0.2 The specified Frequency for each TRS is met if the TRS is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met.

For Frequencies specified as “once,” the above interval extension does not apply.

If a Completion Time requires periodic performance on a “once per . . .” basis, the above Frequency extension applies to each performance after the initial performance.

Exceptions to this TRS are stated in the individual TRSs.

TRS 3.0.3 If it is discovered that a TRS was not performed within its specified Frequency, then compliance with the requirement to declare the TR not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, which ever is greater. This delay period is permitted to allow performance of the TRS. A risk evaluation shall be performed for any TRS delayed greater than 24 hours and the risk impact shall be managed.

If the TRS is not performed within the delay period, the TR must immediately be declared not met, and the applicable Condition(s) must be entered.

When the TRS is performed within the delay period, and the TRS is not met, the TR must immediately be declared not met, and the applicable Condition(s) must be entered.

TRM 3.3 INSTRUMENTATION

TRM 3.3.1 Diverse Actuation System (DAS) Automatic Actuation

TR 3.3.1 DAS automatic actuation functions and DAS automatic actuation initiation signals listed in Table TR 3.3.1-1 shall be FUNCTIONAL.

APPLICABILITY: MODES 1, 2, 3, 4, and 5,
MODE 6 with with upper internals in place,
MODE 6 with cavity level < 23 feet above the top of the reactor vessel
flange.

- NOTE -

DAS ATWS mitigation functions of reactor trip and turbine trip actuation are only required in MODE 1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more automatic actuation functions with one or more required channels not FUNCTIONAL.	A.1 Restore required channel(s) to FUNCTIONAL status.	14 days

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE		FREQUENCY
TRS 3.3.1.1	Perform CHANNEL CHECK on each required channel.	30 hours
TRS 3.3.1.2	Perform CHANNEL OPERATIONAL TEST (COT) on each required channel.	92 days
TRS 3.3.1.3	Perform CHANNEL CALIBRATION on each required channel.	24 months
TRS 3.3.1.4	<p>-----</p> <p style="text-align: center;">- NOTE -</p> <p>Only required to be met in MODE 1.</p> <p>-----</p> <p>Verify rod drive MG set field breakers open on demand.</p>	24 months

Table TR 3.3.1-1 (page 1 of 1)
DAS Automatic Actuation Initiation Signals

INITIATION SIGNAL	REQUIRED CHANNELS	SETPOINT
1. SG Wide Range Level – Low	1 per SG	> 27%
2. Hot Leg Temperature – High	1 per Hot Leg	< 650° F
3. Pressurizer Level - Low	2	> 7%
4. Containment Temperature - High	2	< 200° F

TRM 3.3.1 Diverse Actuation System (DAS) Automatic Actuation

Bases

The DAS automatic actuation functions include: (1) the DAS ATWS mitigation functions of reactor trip (i.e., MG set field breaker trip), turbine trip, and passive residual heat removal heat exchanger (PRHR HX) actuation; and (2) the DAS Engineering Safeguards Features Actuation (ESFA) functions of PRHR HX actuation, CMT actuation, RCP trip, Passive Containment Cooling actuation, and selected containment isolation actuation.

The DAS ATWS mitigation function actuation provides ATWS mitigation capability on:

- SG Wide Range Level – Low; and
- Hot Leg Temperature – High.

This function is important based on 10 CFR 50.62 (ATWS Rule) and because it provides margin in the PRA sensitivity performed assuming no credit for nonsafety-related SSCs to mitigate at-power and shutdown events. The margin provided in the PRA study assumes a minimum availability of 90% for this function during the Applicability, considering both maintenance unavailability and failures to actuate.

The DAS ESFA functions provide accident mitigation capability on:

- SG Wide Range Level – Low;
- Hot Leg Temperature – High;
- Pressurizer Level – Low; and
- Containment Temperature - High.

This function is important because it provides margin in the PRA sensitivity performed assuming no credit for nonsafety-related SSCs to mitigate at-power and shutdown events. The margin provided in the PRA study assumes a minimum availability of 90% for this function during the Applicability, considering both maintenance unavailability and failures to actuate.

The DAS uses a 2-out-of-2 logic to actuate automatic functions. When a required channel is not FUNCTIONAL the automatic DAS function is not FUNCTIONAL. FSAR subsection 7.7.1.11 provides additional information.

Automated operator aids may be used to facilitate performance of the CHANNEL CHECK. An automated tester may be used to facilitate performance of the CHANNEL OPERATIONAL TEST.

The DAS ATWS mitigation function is required during MODE 1 when ATWS is a limiting event. The DAS ESFA mitigation functions are required during MODES 1, 2, 3, 4, 5, and 6 when accident mitigation is beneficial to the PRA results. The DAS ESFA is required in MODE 6 with upper internals in place or reactor cavity level < 23 feet above the top of the reactor vessel flange. Planned maintenance affecting these DAS functions should be performed in MODE 6 when the refueling cavity is ≥ 23 ft; this MODE is selected because requiring DAS ESFA is not anticipated in this MODE.

TRM 3.6 CONTAINMENT SYSTEMS

TRM 3.6.1 Passive Containment Cooling Water Storage Tank (PCCWST) and Spent Fuel Pool Makeup - Long Term Shutdown

TR 3.6.1 Long term makeup to the PCCWST and the Spent Fuel Pool shall be FUNCTIONAL.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Passive containment cooling ancillary water storage tank (PCCAWST) volume \leq 780,000 gal.	A.1 Restore PCCAWST volume to > 780,000 gal.	14 days
B. Required Passive Containment Cooling System (PCS) recirculation pump not FUNCTIONAL.	B.1 Restore required PCS recirculation pump to FUNCTIONAL status.	14 days

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE		FREQUENCY
TRS 3.6.1.1	Verify water volume in the PCCAWST is > 780,000 gal.	31 days
TRS 3.6.1.2	Verify required PCS recirculation pump provides recirculation of the PCCWST at > 100 gpm.	92 days
TRS 3.6.1.3	Verify required PCS recirculation pump transfers > 100 gpm from the PCCAWST to the PCCWST. During this test, required PCS recirculation pump shall be powered from an ancillary diesel.	10 years

TRM 3.6.1 Passive Containment Cooling Water Storage Tank (PCCWST) and Spent Fuel Pool Makeup - Long Term Shutdown

BASES

The PCS recirculation pumps provide long-term shutdown support by transferring water from the PCCAWST to the PCCWST and the spent fuel pool. The specified PCCAWST volume is sufficient to maintain PCS and Spent Fuel Pool cooling during the 3 to 7 day time period following an accident. After 7 days, water brought in from offsite allows the PCCWST to continue to provide PCS cooling and makeup to the spent fuel pool. This PCCWST makeup function is important because it supports long-term shutdown operation. A minimum availability of 90% is assumed for this function during the Applicability, considering both maintenance unavailability and failures to operate.

The PCCWST makeup function involves the use of one PCS recirculation pump, the PCCAWST and the line connecting the PCCAWST with the PCCWST and spent fuel pool. One PCS recirculation pump normally operates to recirculate the PCCWST. FSAR subsections 6.2.2 and 9.1.3 contain additional information on the PCCWST and spent fuel pool makeup function.

The PCCWST makeup function is required during MODES of operation when PCS and spent fuel pool cooling is required; one PCS recirculation pump and PCCAWST are required during all MODES.

Planned maintenance should be performed on the redundant pump (i.e., the pump not required to be FUNCTIONAL). Planned maintenance affecting the PCCAWST that requires less than 72 hours to perform can be performed in any MODE of operation. Planned maintenance requiring more than 72 hours should be performed in MODE 5 or 6 when the calculated core decay heat is ≤ 6.0 MWt. The basis for this recommendation is that the long-term PCS makeup is not required in this condition, and in most cases, the PCCWST can provide the required makeup to the spent fuel pool.

TRM 3.6 CONTAINMENT SYSTEMS

TRM 3.6.2 Hydrogen Igniters

TR 3.6.2 Hydrogen igniters shall be FUNCTIONAL in accordance with Table TR 3.6.2-1.

APPLICABILITY: MODES 1 and 2,
MODE 5 with RCS pressure boundary open,
MODE 6 with with upper internals in place,
MODE 6 with cavity level < 23 feet above the top of the reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required hydrogen igniters not FUNCTIONAL.	A.1 Restore required igniters to FUNCTIONAL status.	14 days

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE	FREQUENCY
TRS 3.6.2.1 Energize each required hydrogen ignitor and verify the surface temperature is > 1700°F.	Each refueling outage

Table TR 3.6.2-1 (page 1 of 1)
Hydrogen Ignitors

LOCATION	REQUIRED IGNITORS
1. Loop Compartment 01	3
2. Loop Compartment 02	3
3. Pressurizer Compartment	3
4. Tunnel connecting Loop Compartments	5
5. Southeast Valve Room & Southeast Accumulator Room	2
6. East Valve Room, Northeast Accumulator Room, & Northeast Valve Room	2(1)
7. North CVS Equipment Room	2
8. Lower Compartment Area (CMT and Valve Area)	10
9. IRWST	5
10. IRWST Inlet	2
11. Refueling Cavity	3
12. Upper Compartment - Lower Region	9
13. Upper Compartment - Mid Region	2
14. Upper Compartment - Upper Region	2

NOTE:

(1) Ignitor 18 and either Ignitor 17 or Ignitor 19.

TRM 3.6.2 Hydrogen Igniters

Bases

The hydrogen igniters are required to provide the capability of burning hydrogen generated during severe accidents in order to prevent failure of the containment due to hydrogen detonation. These hydrogen igniters are required by 10 CFR 50.34 to limit the buildup of hydrogen to less than 10% assuming that 100% of the active zircaloy fuel cladding is oxidized.

This function is also important because it provides margin in the PRA sensitivity performed assuming no credit for nonsafety-related SSCs to mitigate at-power and shutdown events. The margin provided in the PRA study assumes a minimum availability of 90% for this function during the Applicability, considering both maintenance unavailability and failures to operate.

The igniters are distributed in the containment to limit the buildup of hydrogen in local areas. Two groups of igniters are provided in each area; one of which is sufficient to limit the buildup of hydrogen. When an ignitor is energized, the ignitor surface heats up to > 1700°F. This temperature is sufficient to ignite hydrogen in the vicinity of the ignitor when the lower flammability limit is reached. FSAR subsection 6.2.4 provides additional information.

The hydrogen ignitor function is required during MODES 1 and 2 when core decay heat is high and during MODE 5 when the RCS pressure boundary is open and in MODE 6 with cavity level < 23 feet above the top of the reactor vessel flange. Planned maintenance should be performed on hydrogen igniters when they are not required to meet this availability control. Table TR 3.6.2-1 indicates the minimum number of hydrogen igniters that are required.

TRM 3.7 PLANT SYSTEMS

TRM 3.7.1 Normal Residual Heat Removal System (RNS) - Reactor Coolant System (RCS) Makeup

TR 3.7.1 One train of RNS - RCS makeup shall be FUNCTIONAL.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required RNS - RCS makeup train not FUNCTIONAL.	A.1 Restore required RNS - RCS makeup train to FUNCTIONAL status.	14 days

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE		FREQUENCY
TRS 3.7.1.1	Verify required RNS pump develops a differential head of 330 feet on recirculation flow.	92 days
TRS 3.7.1.2	Verify the following valves stroke open: RNS V011, RNS Discharge Containment Isolation RNS V022, RNS Suction Header Containment Isolation RNS V023, RNS Suction from IRWST Isolation RNS V055, RNS Suction from Cask Loading Pit	92 days

TRM 3.7.1 Normal Residual Heat Removal System (RNS) - Reactor Coolant System (RCS) Makeup

Bases

The RNS – RCS makeup function provides a nonsafety-related means of injecting IRWST water into the RCS following ADS actuations. The RNS – RCS makeup function is important because it provides margin in the PRA sensitivity performed assuming no credit for nonsafety-related SSCs to mitigate at-power and shutdown events. The margin provided in the PRA study assumes a minimum availability of 90% for this function during the Applicability, considering both maintenance unavailability and failures to operate.

One train of RNS – RCS makeup includes one RNS pump and the line from the cask loading pit (CLP) to the RCS. One valve in the line between the CLP and the RCS is normally closed and needs to be opened to allow injection. Later on, the RNS suction is switched from the CLP to the IRWST. Two valves in the IRWST line are normally closed and must be opened to allow recirculation. This equipment does not normally operate during MODES 1, 2, and 3. FSAR subsection 5.4.7 contains additional information on the RNS.

The RNS – RCS makeup function is required during MODES 1, 2, and 3 because decay heat is higher and the need for ADS is greater.

Planned maintenance on redundant RNS SSCs should be performed during MODE 1, 2, or 3. Such maintenance should be performed on an RNS SSC not required to be FUNCTIONAL. The basis for this recommendation is that the RNS is more risk important during shutdown MODES when it is normally operating than during other MODES when it only provides a backup to PXS injection.

Planned maintenance on non-redundant RNS valves (such as V011, V022, V023, V055) should be performed to minimize the impact on their RNS – RCS makeup and their containment isolation capability. Non-pressure boundary maintenance should be performed during MODE 5 with a visible pressurizer level or MODE 6 with cavity level ≥ 23 feet above the top of the reactor vessel flange. In these MODES, these valves need to be open but they do not need to be able to close. Containment closure which is required in these MODES can be satisfied by one normally open operable valve. Pressure boundary maintenance can not be performed during MODES when the RNS is used to cool the core, therefore such maintenance should be performed during MODE 1, 2, or 3. Since these valves are also containment isolation valves, maintenance that renders the valves inoperable requires that the containment isolation valve located in series with the inoperable valve has to be closed and de-activated. The basis for this recommendation is that the RNS is more risk important during shutdown MODES when it is normally operating than during other MODES when it only provides a backup to PXS injection. In addition, it is not possible to perform pressure boundary maintenance of these valves during RNS operation.

TRM 3.7 PLANT SYSTEMS

TRM 3.7.2 Normal Residual Heat Removal System (RNS) – Reactor Coolant System (RCS) Open

TR 3.7.2 Two trains of RNS RCS shutdown heat removal shall be FUNCTIONAL and one RNS pump in operation.

APPLICABILITY: MODE 5 with RCS pressure boundary open,
MODE 6 with with upper internals in place,
MODE 6 with cavity level < 23 feet above the top of the reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RNS RCS shutdown heat removal train not FUNCTIONAL. <u>OR</u> Required RNS pump not in operation.	A.1 Initiate actions to increase the water inventory above the core. <u>AND</u> A.2 Restore two trains of RNS RCS shutdown heat removal to FUNCTIONAL status and one RNS pump in operation.	12 hours 72 hours

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE		FREQUENCY
TRM 3.7.2.1	<p>Verify one RNS pump is in operation and that the required RNS pump circulates reactor coolant at a flow > 1580 gpm.</p> <p><u>OR</u></p> <p>Verify both RNS pumps are in operation and circulating reactor coolant at a flow > 2000 gpm.</p>	<p>Within 24 hours prior to entering the Applicability</p>

TRM 3.7.2 Normal Residual Heat Removal System (RNS) – Reactor Coolant System (RCS)
Open

Bases

The RNS cooling function provides a nonsafety-related means to normally cool the RCS during shutdown operations (MODES 4, 5, and 6). This RNS cooling function is important during conditions when the RCS pressure boundary is open and the refueling cavity is not flooded because it reduces the probability of an initiating event due to loss of RNS cooling and because it provides margin in the PRA sensitivity performed assuming no credit for nonsafety-related SSCs to mitigate at-power and shutdown events. The RCS is considered open when its pressure boundary is not intact. The RCS is also considered open if there is no visible level in the pressurizer. The margin provided in the PRA study assumes a minimum availability of 90% for this function during the Applicability, considering both maintenance unavailability and failures to operate.

The RNS cooling of the RCS involves the RNS suction line from the RCS HL, the two RNS pumps and the RNS discharge line returning to the RCS through the DVI lines. The valves located in these lines should be open prior to the plant entering reduced inventory conditions. One of the RNS pumps has to be operating; the other pump may be operating or may be in standby. Standby includes the capability of being able to be placed into operation from the main control room. FSAR subsection 5.4.7 contains additional information on the RNS.

Both RNS pumps are required during the Applicability when the loss of RNS cooling is risk important. If both RNS pumps are not FUNCTIONAL, the plant should not enter these conditions. If the plant has entered reduced inventory conditions, then the plant should take action to restore full system operation or leave the Applicability. If the plant has not restored full system operation or left the Applicability within 12 hours, then actions need to be initiated to increase the RCS water level to either 20% pressurizer level or to a refueling cavity ≥ 23 ft.

Planned maintenance affecting this RNS cooling function should be performed in MODE 1, 2, or 3 when the RNS is not normally operating. The basis for this recommendation is that the RNS is more risk important during shutdown MODES, especially during the Applicability conditions than during other MODES when it only provides a backup to PXS injection.

TRM 3.7 PLANT SYSTEMS

TRM 3.7.3 Component Cooling Water System (CCS) – Reactor Coolant System (RCS) Open

TR 3.7.3 Two CCS trains shall be FUNCTIONAL and one CCS pump in operation to support the operating Normal Residual Heat Removal System (RNS) RCS shutdown heat removal train.

APPLICABILITY: MODE 5 with RCS pressure boundary open,
MODE 6 with with upper internals in place,
MODE 6 with cavity level < 23 feet above the top of the reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CCS train not FUNCTIONAL.	A.1 Initiate actions to increase the water inventory above the core.	12 hours
<u>OR</u>	<u>AND</u>	
Required CCS pump not in operation to support operating RNS RCS shutdown heat removal train.	A.2 Restore two CCS trains to FUNCTIONAL status and one CCS pump in operation to support operating RNS RCS shutdown heat removal train.	72 hours

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE		FREQUENCY
TRM 3.7.3.1	<p>Verify one CCS pump is in operation and each CCS pump operating individually can provide a CCS flow through one RNS heat exchanger > 2685 gpm.</p> <p><u>OR</u></p> <p>Verify both CCS pumps are in operation with CCS flow through each RNS heat exchanger > 2685 gpm.</p>	<p>Within 24 hours prior to entering the Applicability</p>

TRM 3.7.3 Component Cooling Water System (CCS) – Reactor Coolant System (RCS)
Open

Bases

The CCS cooling of the RNS HXs provides a nonsafety-related means to normally cool the RCS during shutdown operations (MODES 4, 5, and 6). This RNS cooling function is important because it reduces the probability of an initiating event due to loss of RNS cooling and because it provides margin in the PRA sensitivity performed assuming no credit for nonsafety-related SSCs to mitigate at-power and shutdown events. The RCS is considered open when its pressure boundary is not intact. The RCS is also considered open if there is no visible level in the pressurizer. The margin provided in the PRA study assumes a minimum availability of 90% for this function during the Applicability, considering both maintenance unavailability and failures to operate.

The CCS cooling of the RNS involves two CCS pumps and HXs and the CCS line to the RNS HXs. The valves around the CCS pumps and HXs and in the lines to the RNS HXs should be open prior to the plant entering these conditions. One of the CCS pumps and its HX has to be operating. One of the lines to a RNS HX also has to be open. The other CCS pump and HX may be operating or may be in standby. Standby includes the capability of being able to be placed into operation from the main control room. FSAR subsection 9.2.2 contains additional information on the CCS.

Both CCS pumps are required during the Applicability when the loss of RNS cooling is risk important. If both CCS pumps are not FUNCTIONAL, the plant should not enter these conditions. If the plant has entered these conditions, then the plant should take action to restore both CCS pumps or to leave these conditions. If the plant has not restored full system operation or left the Applicability within 12 hours, then actions need to be initiated to increase the RCS water level to either 20% pressurizer level or to a refueling cavity ≥ 23 ft.

Planned maintenance affecting this CCS cooling function should be performed in MODE 1, 2, or 3 when the CCS is not supporting RNS operation. The basis for this recommendation is that the CCS is more risk important during shutdown MODES, especially during the Applicability conditions than during other MODES.

TRM 3.7 PLANT SYSTEMS

TRM 3.7.4 Service Water System (SWS) – Reactor Coolant System (RCS) Open

TR 3.7.4 Two SWS trains shall be FUNCTIONAL and one SWS pump in operation to support Component Cooling Water System (CCS) cooling.

APPLICABILITY: MODE 5 with RCS pressure boundary open,
MODE 6 with with upper internals in place,
MODE 6 with cavity level < 23 feet above the top of the reactor vessel flange.

ACTIONS

CONDITION		REQUIRED ACTION	COMPLETION TIME
A.	One SWS train not FUNCTIONAL.	A.1 Initiate actions to increase the water inventory above the core.	12 hours
	<u>OR</u> Required SWS pump not in operation to support CCS cooling.	<u>AND</u> A.2 Restore two SWS trains to FUNCTIONAL status and one SWS pump in operation to support CCS cooling.	72 hours

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE		FREQUENCY
TRS 3.7.4.1	Verify one SWS pump is in operation and each SWS pump operating individually can provide a SWS flow > 10,000 gpm.	Within 24 hours prior to entering the Applicability
TRS 3.7.4.2	Operate each cooling tower fan for > 15 min.	Within 24 hours prior to entering the Applicability

TRM 3.7.4 Service Water System (SWS) – Reactor Coolant System (RCS) Open

Bases

The SWS cooling of the CCS HXs provides a nonsafety-related means to normally cool the RNS HX which cools the RCS during shutdown operations (MODES 4, 5, and 6). This RNS cooling function is important because it reduces the probability of an initiating event due to loss of RNS cooling and because it provides margin in the PRA sensitivity performed assuming no credit for nonsafety-related SSCs to mitigate at-power and shutdown events. The RCS is considered open when its pressure boundary is not intact. The RCS is also considered open if there is no visible level in the pressurizer. The margin provided in the PRA study assumes a minimum availability of 90% for this function during the Applicability, considering both maintenance unavailability and failures to operate.

The SWS cooling of the CCS HXs involves two SWS pumps and cooling tower fans and the SWS line to the CCS HXs. The valves in the SWS lines should be open prior to the plant entering these conditions. One of the SWS pumps and its cooling tower fan has to be operating. The other SWS pump and cooling tower fan may be operating or may be in standby. Standby includes the capability of being able to be placed into operation from the main control room. FSAR subsection 9.2.1 contains additional information on the SWS.

Both SWS pumps and cooling tower fans are required during the Applicability when the loss of RNS cooling is risk important. If both SWS pumps and cooling tower fans are not FUNCTIONAL, the plant should not enter these conditions. If the plant has entered these conditions, then the plant should take action to restore both SWS pumps / fans or to leave these conditions. If the plant has not restored full system operation or left the Applicability within 12 hours, then actions need to be initiated to increase the RCS water level to either 20% pressurizer level or to a refueling cavity ≥ 23 ft.

Planned maintenance affecting this SWS cooling function should be performed in MODES when the SWS is not supporting RNS operation, i.e., during MODE 1, 2, or 3. The basis for this recommendation is that the SWS is more risk important during shutdown MODES, especially during the Applicability conditions than during other MODES.

TRM 3.7 PLANT SYSTEMS

TRM 3.7.5 Main Control Room (MCR) Cooling - Long Term Shutdown

TR 3.7.5 Long term cooling of the MCR shall be FUNCTIONAL.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required MCR ancillary fan not FUNCTIONAL.	A.1 Restore required MCR ancillary fan to FUNCTIONAL status.	14 days

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE		FREQUENCY
TRS 3.7.5.1	Operate required MCR ancillary fan for > 15 min.	92 days
TRS 3.7.5.2	Verify required MCR ancillary fan can provide a flow of air into the MCR for > 15 min. During this test, the required MCR ancillary fan will be powered from an ancillary diesel.	10 years

TRM 3.7.5 Main Control Room (MCR) Cooling - Long Term Shutdown

Bases

The MCR ancillary fans provide long term shutdown support by cooling the main control room. For the first three days after an accident the emergency HVAC system (VES) together with the passive heat sinks in the MCR provide cooling of the MCR. After 3 days, the MCR ancillary fans can be used to circulate ambient air through the MCR to provide cooling. The long term MCR cooling function is required during all MODES of operation. This long term MCR cooling function is important because it supports long-term shutdown operation. A minimum availability of 90% is assumed for this function during the Applicability, considering both maintenance unavailability and failures to operate.

The long term MCR cooling function involves the use of a MCR ancillary fan. During TRS 3.7.5.1 the required fan will be run to verify that it operates without providing flow to the MCR. During TRS 3.7.5.2 the required fan will be connected to the MCR and operated such that it provides flow to the MCR. FSAR subsection 9.4.1 contains additional information on the long term MCR cooling function.

One MCR ancillary fan is required during all MODES of plant operation. Planned maintenance should not be performed on the required MCR ancillary fan during a required MODE of operation; planned maintenance should be performed on the redundant MCR ancillary fan (i.e., the fan not required to be FUNCTIONAL) during MODE 3 or 4, MODE 5 with a visible pressurizer level, or MODE 6 with the refueling cavity ≥ 23 ft; these MODES are selected because the reactor is tripped in these MODES and the risk of core damage is low.

TRM 3.7 PLANT SYSTEMS

TRM 3.7.6 I&C Room Cooling - Long Term Shutdown

TR 3.7.6 Long term cooling of I&C rooms B & C shall be FUNCTIONAL.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One I&C room ancillary fan not FUNCTIONAL.	A.1 Restore I&C room ancillary fan to FUNCTIONAL status.	14 days

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE		FREQUENCY
TRS 3.7.6.1	Operate each I&C room ancillary fan for > 15 min.	92 days
TRS 3.7.6.2	Verify each I&C room ancillary fan can provide a flow of air into an I&C room for > 15 min. During this test, the I&C room ancillary fans will be powered from an ancillary diesel.	10 years

TRM 3.7.6 I&C Room Cooling - Long Term Shutdown

Bases

The I&C room ancillary fans provide long term shutdown support by cooling I&C rooms B & C which contain post accident instrument processing equipment. For the first three days after an accident the passive heat sinks in the I&C rooms provide cooling. After 3 days, the I&C room ancillary fans can be used to circulate ambient air through the I&C room to provide cooling. The long term I&C room cooling function is required during all MODES of operation. This long term I&C room cooling function is important because it supports long-term shutdown operation. A minimum availability of 90% is assumed for this function during the Applicability, considering both maintenance unavailability and failures to operate.

The long term I&C room cooling function involves the use of two I&C room ancillary fans; each fan is associated with one I&C room (B or C). During TRS 3.7.6.1 each fan will be run to verify that it operates without providing flow to the I&C room. During TRS 3.7.6.2 each fan will be connected to its associated I&C room and operated such that flow is provided to the I&C room. FSAR subsection 9.4.1 contains additional information on the long term I&C room cooling function.

Both I&C room ancillary fans are required during all MODES of plant operation.

TRM 3.8 ELECTRICAL POWER SYSTEMS

TRM 3.8.1 AC Power Supplies - Operating

TR 3.8.1 One standby diesel generator shall be FUNCTIONAL.

APPLICABILITY: MODES 1, 2, 3, 4, and 5.

ACTIONS

CONDITION		REQUIRED ACTION	COMPLETION TIME
A.	Fuel volume in required standby diesel fuel tank \leq 50,000 gal.	A.1 Restore fuel volume in required standby diesel fuel tank to $>$ 50,000 gal.	14 days
B.	Required fuel transfer pump or standby diesel generator not FUNCTIONAL.	B.1 Restore required fuel transfer pump and diesel generator to FUNCTIONAL status.	14 days

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE		FREQUENCY
TRS 3.8.1.1	Verify fuel oil volume in required standby diesel generator fuel tank is > 50,000 gal.	31 days
TRS 3.8.1.2	Verify required fuel oil transfer pump provides a recirculation flow of > 8 gpm.	92 days
TRS 3.8.1.3	Verify required standby diesel generator starts and operates at > 4000 kw for > 1 hour. This test may utilize diesel engine prelube prior to starting and a warmup period prior to loading.	92 days
TRS 3.8.1.4	Verify the required standby diesel generator starts and operates at > 4000 kw for > 24 hours. This test may utilize diesel engine prelube prior to starting and a warmup period prior to loading. Both diesel generators shall be operated at the same time during this test.	10 years

TRM 3.8.1 AC Power Supplies - Operating

Bases

AC power is required to power the RNS and to provide a nonsafety-related means of supplying power to the safety-related PMS for actuation and post accident monitoring. The RNS provides a nonsafety-related means to inject water into the RCS following ADS actuations in MODES 1, 2, 3, and 4 (when steam generators cool the RCS). This AC power supply function is important because it adds margin to the PRA sensitivity performed assuming no credit for nonsafety-related SSCs to mitigate at-power and shutdown events. The margin provided in the PRA study assumes a minimum availability of 90% for this function during the Applicability, considering both maintenance unavailability and failures to operate.

Two standby diesel generators are provided. Each standby diesel generator has its own fuel oil transfer pump and fuel oil tank. The volume of fuel oil required is that volume that is above the connection to the fuel oil transfer pump. FSAR subsection 8.3.1 contains additional information.

This AC power supply function is required during MODES 1, 2, 3, 4, and 5 when RNS injection and PMS actuation are more risk important. Planned maintenance should not be performed on required AC power supply SSCs during a required MODE of operation; planned maintenance should be performed on redundant AC power supply SSCs during MODE 1, 2, or 3 when the RNS is not normally in operation. The basis for this recommendation is that the AC power is more risk important during shutdown MODES, especially when the RCS is open as defined in TRM 3.7.2 Bases, than during other MODES.

TRM 3.8 ELECTRICAL POWER SYSTEMS

TRM 3.8.2 AC Power Supplies – Reactor Coolant System (RCS) Open

TR 3.8.2 The following AC power supplies shall be FUNCTIONAL to support Normal Residual Heat Removal System (RNS) operation:

- a. One offsite circuit; and
- b. One standby diesel generator.

APPLICABILITY: MODE 5 with RCS pressure boundary open,
 MODE 6 with with upper internals in place,
 MODE 6 with cavity level < 23 feet above the top of the reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required AC power supply not FUNCTIONAL.	A.1 Initiate actions to increase the water inventory above the core.	12 hours
	<u>AND</u> A.2 Restore required AC power supply to FUNCTIONAL status.	72 hours

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE	FREQUENCY
TRS 3.8.2.1 Verify required AC power supplies are FUNCTIONAL.	Within 24 hours prior to entering the Applicability

TRM 3.8.2 AC Power Supplies – Reactor Coolant System (RCS) Open

Bases

AC power is required to power the RNS and its required support systems (CCS & SWS); the RNS provides a nonsafety-related means to normally cool the RCS during shutdown operations. This RNS cooling function is important when the RCS pressure boundary is open and the refueling cavity is not flooded because it reduces the probability of an initiating event due to loss of RNS cooling during these conditions and because it provides margin in the PRA sensitivity performed assuming no credit for nonsafety-related SSCs to mitigate at-power and shutdown events. The RCS is considered open when its pressure boundary is not intact. The RCS is also considered open if there is no visible level in the pressurizer. The margin provided in the PRA study assumes a minimum availability of 90% for this function during the Applicability, considering both maintenance unavailability and failures to operate.

Two AC power supplies, one offsite and one onsite supply, are required as follows:

- a) Offsite power through the transmission switchyard and either the main step-up transformer / unit auxiliary transformer or the reserve auxiliary transformer supply from the transmission switchyard, and
- b) Onsite power from one of the two standby diesel generators.

FSAR subsection 8.3.1 contains additional information on the standby diesel generators. FSAR Section 8.2 contains information on the offsite AC power supply.

One offsite and one onsite AC power supply are required during the Applicability when the loss of RNS cooling is important. If both of these AC power supplies are not FUNCTIONAL, the plant should not enter these conditions. If the plant has already entered these conditions, then the plant should take action to restore this AC power supply function or to leave these conditions. If the plant has not restored full system operation or left the Applicability within 12 hours, then actions need to be initiated to increase the RCS water level to either 20% pressurizer level or to a refueling cavity ≥ 23 ft.

Planned maintenance should not be performed on required AC power supply SSCs. Planned maintenance affecting the standby diesel generators should be performed in MODE 1, 2, or 3 when the RNS is not normally in operation. Planned maintenance of the other AC power supply should be performed in MODE 2, 3, or 6 with the refueling cavity ≥ 23 ft. The basis for this recommendation is that the AC power is more risk important during shutdown MODES, especially during the Applicability conditions than during other MODES.

TRM 3.8 ELECTRICAL POWER SYSTEMS

TRM 3.8.3 AC Power Supplies – Long Term Shutdown

TR 3.8.3 One ancillary diesel generator shall be FUNCTIONAL.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6.

ACTIONS

CONDITION		REQUIRED ACTION	COMPLETION TIME
A.	Fuel volume in ancillary diesel fuel tank ≤ 600 gal.	A.1 Restore fuel volume in ancillary diesel fuel tank > 600 gal.	14 days
B.	Required ancillary diesel generator not FUNCTIONAL.	B.1 Restore required ancillary diesel generator to FUNCTIONAL status.	14 days

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE		FREQUENCY
TRS 3.8.3.1	Verify fuel volume in ancillary fuel tank is > 600 gal.	31 days
TRS 3.8.3.2	Verify required ancillary diesel generator starts and operates for > 1 hour connected to a test load > 35 kw. This test may utilize diesel engine warmup period prior to loading	92 days
TRS 3.8.3.3	Verify required ancillary diesel generator starts and operates for 4 hours while providing power to the regulating transformer, an ancillary control room fan, an ancillary I&C room fan and a passive containment cooling water storage tank recirculation pump that it will power in a long term post accident condition. Test loads will be applied to the output of the regulating transformers that represent the loads required for post-accident monitoring and control room lighting. This test may utilize diesel engine warmup prior to loading. Both diesel generators will be operated at the same time during this test.	10 years

TRM 3.8.3 AC Power Supplies – Long Term Shutdown

Bases

The ancillary diesel generators provide long term power supplies for post accident monitoring, MCR and I&C room cooling, PCS and spent fuel water makeup. For the first 3 days after an accident, the 1E batteries provide power for post accident monitoring. Passive heat sinks provide cooling of the MCR and the I&C rooms. The initial water supply in the PCCWST provides for at least 3 days of PCS cooling. The initial water volume in the spent fuel pool normally provides for 7 days of spent fuel cooling; in some shutdown events the PCCWST is used to supplement the spent fuel pool. A minimum availability of 90% is assumed for this function during the Applicability, considering both maintenance unavailability and failures to operate.

After 3 days, ancillary diesel generators can be used to power the MCR and I&C room ancillary fans, the PCS recirculation pumps, and MCR lighting. In this time frame, the PCCWST provides water makeup to both the PCS and the spent fuel pool. An ancillary generator is required during all MODES of operation. This long term AC power supply function is important because it supports long-term shutdown operation.

The long-term AC power supply function involves the use of two ancillary diesel generators and an ancillary diesel generator fuel oil storage tank. The specified ancillary fuel oil storage tank volume is based on operation of both ancillary diesel-generators for 4 days. FSAR subsection 8.3.1 contains additional information on the long-term AC power supply function.

One ancillary diesel generator and the ancillary diesel generator fuel oil storage tank are required during all MODES of plant operation. Planned maintenance should not be performed on the required ancillary diesel generator during a required MODE of operation; planned maintenance should be performed on the redundant ancillary diesel generator. Planned maintenance affecting the ancillary diesel fuel tank that requires less than 72 hours to perform can be performed in any MODE of operation. Planned maintenance requiring more than 72 hours should be performed in MODE 6 with the refueling cavity ≥ 23 ft. The basis for this recommendation is that core decay heat is low and the risk of core damage is low in these MODES, the inventory of the refueling cavity results in slow response of the plant to accidents.

TRM 3.8 ELECTRICAL POWER SYSTEMS

TRM 3.8.4 Non Class 1E DC and UPS System (EDS)

TR 3.8.4 Power for DAS automatic actuation functions required by TR 3.3.1 shall be FUNCTIONAL.

APPLICABILITY: MODES 1, 2, 3, 4, and 5,
MODE 6 with with upper internals in place,
MODE 6 with cavity level < 23 feet above the top of the reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Power to DAS Function not FUNCTIONAL.	A.1 Restore power supply to DAS to FUNCTIONAL status.	14 days

TECHNICAL REQUIREMENT SURVEILLANCE

SURVEILLANCE	FREQUENCY
TRS 3.8.4.1 Verify power supply voltage at each DAS cabinet is 120 volts ± 5%.	92 days

TRM 3.8.4 Non Class 1E DC and UPS System (EDS)

Bases

The EDS function of providing power to DAS to support ATWS mitigation is important based on 10 CFR 50.62 (ATWS Rule) and to support ESFA is important based on providing margin in the PRA sensitivity performed assuming no credit for nonsafety-related SSCs to mitigate at-power and shutdown events. The margin provided in the PRA study assumes a minimum availability of 90% for this function during the Applicability, considering both maintenance unavailability and failures to operate.

The DAS uses a 2-out-of-2 logic to actuate automatic functions. EDS power is required for the DAS sensors, DAS actuation, and the devices which control the actuated components. Power may be provided by EDS to DAS by non-1E batteries through non-1E inverters. Other means of providing power to DAS include the spare battery through a non-1E inverter or non-1E regulating transformers.

The EDS support of the DAS ATWS mitigation function is required during MODE 1 when ATWS is a limiting event and during MODES 1, 2, 3, 4, 5, and 6 when ESFA is important. The DAS ESFA is required in MODE 6 with upper internals in place or with cavity level < 23 feet above the top of the reactor vessel flange. Planned maintenance should not be performed on a required EDS SSC during a required MODE of operation; planned maintenance should be performed on redundant supplies of EDS power.
