



NUCLEAR ENERGY INSTITUTE

James W. Davis  
DIRECTOR  
OPERATIONS DEPARTMENT,  
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January 14, 2000

Dr. William D. Beckner, Branch Chief  
Technical Specifications Branch  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT:** Forwarding of TSTFs

**PROJECT NUMBER:** 689

Dear Dr. Beckner:

Enclosed are five revised and one new Technical Specification NUREGs NEI Technical Specification Task Force (TSTF) Travelers.

Revised travelers are TSTF-204, Rev. 3, TSTF-283, Rev. 3, TSTF-284, Rev. 3, TSTF-286, Rev. 2, TSTF-287, Rev. 5 and TSTF-297, Rev. 1 (cover page editorial change only).

In addition, TSTF-355, Rev. 0, is provided which incorporates your proposed TSB-20, Rev. 1.

TSTF-92, Rev. 1, is withdrawn. The changes proposed in TSTF-92 have been incorporated into TSTF-284, in accordance with NRC recommendations.

The TSTF accepts the NRC's rejection of TSTF 236, Rev. 0.

In addition to the identified Travelers which the staff and the industry have agreed must be included in Revision 2, the TSTF asks that the NRC consider the following Travelers as "targets of opportunity" for incorporation into Revision 2. The staff had requested revisions to each of the following Travelers and the industry responded with the requested changes. The TSTF believes these Travelers could be easily approved. The TSTF asks that the staff review these items, if time allows and on a "not to interfere" basis with the Travelers identified for incorporation into Revision 2, in order to reduce the number of generic changes that will remain for consideration after issuance of Revision 2. A summary of these changes appears below.

*ADL 9/11*

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TSTF-169, Rev. 1, "Delete Condition 3.3.1.N" – The NRC approved Rev. 0 on October 6, 1997. On January 20, 1999, the staff requested two changes. The TSTF provided the requested changes on June 23, 1999.

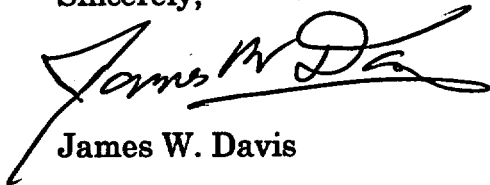
TSTF-231, Rev. 1, "Reword Bases for Turbine Stop Valve (TSV) Closure function of RPS Instrumentation LCO" – The NRC requested a Bases clarification to Rev. 0 on August 4, 1999. The TSTF provided the requested change on August 31, 1999.

TSTF-254, Rev. 1, "Extend Frequency of accumulated water checks for DG fuel oil." On April 21, 1999, the NRC requested that the TSTF withdrawn Revision 0, which deleted the Surveillance, and replace it with a change which extended the Surveillance Frequency to 92 days. On July 20, 1999, the TSTF provided the revised Traveler.

TSTF-262, Rev. 1, "3.4.6, 3.4.7, and 3.4.8: Allow DHR/RHR/SDC pumps to be aligned for LPI" – On April 28, 1999, the NRC requested that the TSTF revise the justification section of the Traveler cover page to provide additional information on the operability of DHR/RHR/SDC when aligned for low pressure injection. The TSTF provided a revision with this information on 6/23/99.

Please contact me at (202) 739-8105 or Vince Gilbert at (202) 739-8138 if you have any questions or need to meet with industry experts on these recommended changes.

Sincerely,

A handwritten signature in black ink that reads "James W. Davis". The signature is written in a cursive style with a large, sweeping initial "J".

James W. Davis

Enclosures

c: Patricia Coates  
Stewart L. Magruder NRR-DRPM  
Technical Specification Task Force

## Industry/TSTF Standard Technical Specification Change Traveler

### Addition of Required Action C.1 to 3.3.2.2, Feedwater - Main Turbine High Water Level Trip Inst.

Classification: 3) Improve Specifications

NUREGs Affected:  1430  1431  1432  1433  1434

**Description:**

NUREG-1433, LCO 3.3.2.2 Required Action C.1 requires that THERMAL POWER be reduced to less than 25% RTP within 4 hours. This change adds a new Required Action and a corresponding Note to allow affected feedwater pumps and main turbine valve(s) to be removed from service. The change is necessary to allow components to be removed from service to fulfill the safety function without requiring a reduction in power to < 25% RTP. A similar Note is added to LCO 3.3.4.1 (EOC-RPT) (BWR/4 only) Required Action C.1 and LCO 3.3.4.2 (ATWS RPT) Required Action D.1 to provide the same clarification for when the associated Required Action is the appropriate Action.

**Justification:**

This change is acceptable because it provides operational flexibility, which could prevent an unnecessary reduction in power to less than 25% RTP. For example, if the required instrument trip Function is degraded only to the point of rendering main feed pump(s) incapable of tripping on reactor vessel high water level, the affected main feed pump(s) and main turbine valve(s) can be removed from service (satisfying the safety function). In this condition, although the trip function is not considered OPERABLE, the safety function has been implemented and therefore, no additional compensatory actions are necessary. For LCO 3.3.4.1 (BWR/4 only) and LCO 3.3.4.2, the change is required to provide a consistent clarification of when the associated Required Actions are the appropriate Action.

The BWR/6 LCO 3.3.4.1 (EOC-RPT), Required Action C.1, is not modified because the Required Action is appropriate regardless of the source of the inoperability due to the MODE of Applicability of the LCO being exited by taking the recirculation pump(s) out of fast speed.

|                   |                 |                      |                             |
|-------------------|-----------------|----------------------|-----------------------------|
| Industry Contact: | Pontious, Harry | (815) 357-6761,X2231 | harold.d.pontiousjr@ucm.com |
| NRC Contact:      | Schulten, Carl  | 301-314-1192         | css1@nrc.gov                |

### Revision History

#### OG Revision 0

Revision Status: Closed

Revision Proposed by: Susquehanna

Revision Description:  
Original Issue

#### Owners Group Review Information

Date Originated by OG: 13-Aug-97

Owners Group Comments  
(No Comments)

Owners Group Resolution: Approved Date: 11-Feb-98

#### TSTF Review Information

TSTF Received Date: 11-Feb-98 Date Distributed for Review 28-May-98

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

1/11/00

## Industry/TSTF Standard Technical Specification Change Traveler

**Revise DC Sources - Shutdown and Inverters - Shutdown to Address Specific Subsystem Requirements**

**Classification:** 1) Correct Specifications

**NUREGs Affected:**  1430  1431  1432  1433  1434

**Description:**

DC Sources - Shutdown and Inverters - Shutdown LCOs are revised to provide an option to reflect typical CTS requirements.

**Justification:**

As written, the NUREG LCO requirements for DC Sources - Shutdown and Inverters - Shutdown imply that a full complement of battery AND charger are required for both subsystems. Similarly, for Inverters - Shutdown, a DC battery-backed inverter is required for both divisions or trains. The requirements for the second subsystem (division or train) is not typically required by the current Technical Specifications for most plants. This change provides a consistent format and presentation for plants converting to the ITS but retaining current requirements.

**Industry Contact:** Buschbaum, Denny (254) 897-5851 dbuschb1@tuelectric.com

**NRC Contact:** Tomlinson, Ed 301-314-3137 ebt@nrc.gov

### Revision History

#### OG Revision 0

**Revision Status: Closed**

**Revision Proposed by:** WOG Mini-Group

**Revision Description:**  
Original Issue

#### Owners Group Review Information

**Date Originated by OG:** 16-Aug-96

**Owners Group Comments**  
(No Comments)

**Owners Group Resolution:** Approved **Date:** 16-Aug-96

#### TSTF Review Information

**TSTF Received Date:** 27-Sep-96 **Date Distributed for Review** 27-Sep-96

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

**TSTF Comments:**

CEOG, BWROG and BWOG approves. Applicable.  
Revise to address uniqueness of BWR/6 for Division 3.

**TSTF Resolution:** Approved **Date:** 05-Feb-98

#### NRC Review Information

**NRC Received Date:** 03-Mar-98

**NRC Comments:**

7/16/98 - The proposed change is unacceptable on the basis that it is a change to NRC requirements that is

1/10/00



**OG Revision 0****Revision Status: Closed**

beyond approved staff positions, presents a possible increase in plant risk, and is not supported by adequate justification. The intent of the proposed change appears also the revise the LCOs format such that they will reflect more specific requirements (i.e., LCOs for DC Sources - Shutdown and Inverters - Shutdown) similar to that of LCOs for the AC Sources - Shutdown. The OGs (TSTF) indicated in the traveler that the proposed change is consistent with the initial philosophy of the ITS NUREG, but no supporting justification is provided. Additionally, the staff finds that:

(1) For PWRs, the NUREG LCOs require multiple trains/divisions of DC sources and inverters if multiple trains/divisions of safety systems are required to be OPERABLE during shutdown. Conversely, if the plant is configured such that all required safety systems are on one train/division, only one train/division of DC sources and inverters must be OPERABLE. The proposed change does not appear to address this. Specifically, they have not explained how less than a full complement of DC sources and inverters will "continue to assure that sufficient power is available to support the response to events postulated during shutdown conditions in the event of a loss of offsite power or a single failure." For example, it is not explained how an AC vital bus powered from a regulated AC source will perform its intended function in the event of a LOOP, or how a DC distribution subsystem powered from a battery changer will perform its intended function under the same circumstances. In addition, the proposed change does not appear to be compatible with LCO 3.8.2, and it does not provide any assurance that a DG will be aligned to a train/division with a full compliment of DC sources and inverters.

(2) For BWRs, the proposed change does not provide any justifications for allowing Div 3 DC power and inverter to be less than a full compliment.

12/16/98 - NRC agreed to recommend approval of TSTF-204 but that the issue of class IE alternative power supplies needed to be resolved. NRC will discuss the issue and get back to the TSTF by 1/15/99. The TSTF will provide some specific problems with requiring 1E alternative power supplies to the NRC by 1/4/99. TSTF will also review 204 to make the presentation of the DC Systems LCO requirements consistent with the AC Systems LCO requirements by 1/15/99.

5/13/99 - NRC / TSTF meeting comments. The EELB wanted the TSTF to justify the acceptability of the NEI/NUMARC guidance for Shutdown Risk versus the NRC Shutdown Risk - we need to separate the TS criteria versus the burden, impact on maintenance issues. TSTF to provide a sampling of TS pages and an explanation of the burden of this problem to justify the change. Bob D believes that the approach should be the multiple approach of 1 required system and 2 required systems in [ ] in the NUREG for inclusion in Rev 2 with a Reviewers Note for the change consistent with plant specific applications.

Final Resolution: Superseded by Revision

Final Resolution Date: 13-May-99

**TSTF Revision 1****Revision Status: Closed**

Revision Proposed by: NRC

**Revision Description:**

Rev 0 proposed a "middle ground" for DC and Inverter requirements; one that reflected specific minimum requirements for each train/division that needed power. Since this approach (which mimicked the requirements of 3.8.2 for AC Sources - Shutdown) is not acceptable, Revision 1 simply provides an option for the proper format when retaining the typical CTS requirements.

**TSTF Review Information**

TSTF Received Date: 15-Jun-99

Date Distributed for Review 15-Jun-99

OG Review Completed:  BWO  WOG  CEOG  BWROG

1/10/00

**TSTF Revision 1****Revision Status: Closed**

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 15-Jun-99

**NRC Review Information**

NRC Received Date: 23-Jun-99

NRC Comments:

8/30/99 - Favorable comments received from Tech Branches. To be provided to TSTF by 8/31/99.

Final Resolution: Superseded by Revision

Final Resolution Date: 22-Oct-99

**TSTF Revision 2****Revision Status: Closed**

Revision Proposed by: NRC

Revision Description:

Revision 2 made 2 changes to address NRC comments. The first change modifies the Reviewer's Note to clarify that the current licensing basis (CLB) is in the plant-specific CTS. The second change adds a sentence to the end of the Bases insert for LCO 3.8.5 and 3.8.8 to clarify that, in addition to the Technical Specifications requirements, the plant must manage shutdown tasks and associated electrical support to maintain risk at an acceptably low level.

**TSTF Review Information**

TSTF Received Date: 21-Nov-99 Date Distributed for Review 18-Nov-99

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 18-Nov-99

**NRC Review Information**

NRC Received Date: 23-Nov-99

NRC Comments:

12/14/99 - NRC has counter proposal for the Bases. To provide to TSTF.

12/21/99 - The staff proposed an addition to the Bases of the subject specification: The Shutdown Technical Specification requirements are designed to ensure that the unit has the capability to mitigate the consequences of certain postulated accident. Worst case Design Basis Accidents which are analyzed for operating modes are generally viewed not to be a significant concern during shutdown modes due to the lower energies involved. The Technical Specifications therefore require a lesser complement of electrical equipment to be available during shutdown that is required during operating modes. More recent work completed on the potential risks associated with shutdown, however, have found significant risk associated with certain shutdown evolutions. As a result, in addition to the requirements established in the Technical Specifications, the Industry has committed to NUMARC-91-06, "Guidelines for Industry Actions to Assess Shutdown Management" to manage shutdown tasks and associated electrical support to maintain risk at an acceptably low level. This may require the availability of additional equipment beyond that required by the Shutdown Technical Specifications.

1/10/00

**TSTF Revision 2****Revision Status: Closed**

Final Resolution: Superseded by Revision

Final Resolution Date:

**TSTF Revision 3****Revision Status: Active****Next Action: NRC**

Revision Proposed by: NRC

Revision Description:

Revised the Bases Insert to incorporate NRC suggested changes.

**TSTF Review Information**

TSTF Received Date: 10-Jan-00

Date Distributed for Review 10-Jan-00

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 10-Jan-00

**NRC Review Information**

NRC Received Date: 11-Jan-00

NRC Comments:

(No Comments)

Final Resolution: NRC Action Pending

Final Resolution Date:

**Incorporation Into the NUREGs**

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

**Affected Technical Specifications**

S/A 3.8.5 Bases DC Sources - Shutdown

LCO 3.8.5 DC Sources - Shutdown

LCO 3.8.5 Bases DC Sources - Shutdown

S/A 3.8.8 Bases Inverters - Shutdown

LCO 3.8.8 Inverters - Shutdown

LCO 3.8.8 Bases Inverters - Shutdown

Action 3.8.8.A Inverters - Shutdown

Action 3.8.8.A Bases Inverters - Shutdown

1/10/00

INSERT 3.8.5

[ One DC electrical power subsystem shall be OPERABLE . ]

Reviewer's Note: This second option above applies for plants having a pre-ITS licensing basis (CTS) for electrical power requirements during shutdown conditions that required only one DC electrical power subsystem to be OPERABLE. The "[or more]" optional wording in Condition A is also eliminated for this case. The first option above is adopted for plants that have a licensing basis (CTS) requiring the same level of DC electrical power subsystem support as is required for power operating conditions.

INSERT 3.8.8

[ [One] inverter[s] shall be OPERABLE. ]

Reviewer's Note: This second option above applies for plants having a pre-ITS licensing basis (CTS) for electrical power requirements during shutdown conditions that required only [one] inverter to be OPERABLE. The "[or more]" optional wording in Condition A is also eliminated for this case. The first option above is adopted for plants that have a licensing basis (CTS) requiring the same level of DC electrical power subsystem / inverter support as is required for power operating conditions.

INSERT BASES

In general, when the unit is shut down, the Technical Specifications requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES [1, 2, 3, and 4 {for PWRs}] [1, 2, and 3 {for BWRs}] have no specific analyses in MODES [5 and 6 {for PWRs}] [4 and 5 {for BWRs}]. Worst case bounding events are deemed not credible in MODES [5 and 6 {for PWRs}] [4 and 5 {for BWRs}] because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and the corresponding stresses result in the probabilities of occurrence being significantly reduced or eliminated, and in minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

The shutdown Technical Specification requirements are designed to ensure that the unit has the capability to mitigate the consequences of certain postulated accidents. Worst case Design Basis Accidents which are analyzed for operating MODES are generally viewed not to be a significant concern during shutdown MODES due to the lower energies involved. The Technical specifications therefore require a lesser complement of electrical equipment to be available during shutdown than is required during operating MODES. More recent work completed on the potential risks associated with shutdown, however, have found significant risk associated with certain shutdown evolutions. As a result, in addition to the requirements established in the Technical Specifications, the industry has adopted NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," as an Industry initiative to manage shutdown tasks and associated electrical support to maintain risk at an acceptable low level. This may require the availability of additional equipment beyond that required by the shutdown Technical Specifications.

TSTF-204 REV B

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

LCO 3.8.5

DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

INSERT 3.8.5 →

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME |
|--|--|-----------------|
| A. One [or more] required DC electrical power subsystem[s] inoperable. | A.1 Declare affected required feature(s) inoperable.                                 | Immediately     |
|  | <u>OR</u>  |                 |
|  | A.2.1 Suspend CORE ALTERATIONS.  | Immediately     |
|  | <u>AND</u>   |                 |
|  | A.2.2 Suspend movement of irradiated fuel assemblies.                                | Immediately     |
|  | <u>AND</u>   |                 |
|  | A.2.3 Initiate action to suspend operations involving positive reactivity additions. | Immediately     |
|  | <u>AND</u>   |                 |
|  |  | (continued)     |

TSTF-204  
REV B

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters—Shutdown

LCO 3.8.8

v

v

Inverters shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

INSERT 3.8.8 →

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| A. One [or more] [required] inverters inoperable. | A.1 Declare affected required feature(s) inoperable.                                 | Immediately     |
|   | <u>OR</u>  |                 |
|   | A.2.1 Suspend CORE ALTERATIONS.  | Immediately     |
|   | <u>AND</u>   |                 |
|   | A.2.2 Suspend movement of irradiated fuel assemblies.                                | Immediately     |
|   | <u>AND</u>   |                 |
|   | A.2.3 Initiate action to suspend operations involving positive reactivity additions. | Immediately     |
|   | <u>AND</u>   |                 |
|   |  | (continued)     |

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources—Shutdown

TSTF-204  
REV 3

BASES

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BACKGROUND

A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources—Operating."

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APPLICABLE  
SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [14] (Ref. 2), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 5 and 6 and during movement of irradiated fuel assemblies ensures that:

- a. The unit can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident.

INSERT  
BASES →

The DC sources satisfy Criterion 3 of the NRC Policy Statement.

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LCO

The DC electrical power subsystems, [each subsystem <sup>required</sup>] [the required] consisting of two batteries, one battery charger per battery, and the corresponding control equipment and interconnecting cabling within the train, [are] required to be

[is]

(continued)

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TSTF-204 REV B

BASES

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LCO  
(continued)

OPERABLE to support <sup>[one]</sup> [required] trains of the distribution systems [required] OPERABLE by LCO 3.8.10, "Distribution Systems—Shutdown." This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

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APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 5 and 6 and during movement of irradiated fuel assemblies, provide assurance that:

- a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core;
- b. Required features needed to mitigate a fuel handling accident are available;
- c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The DC electrical power requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.4.

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

[If two trains are required by LCO 3.8.10, the remaining train with DC power available may be capable of supporting sufficient systems to allow continuation of CORE ALTERATIONS and fuel movement.] By allowing the option to declare required features inoperable with the associated DC power source(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCO ACTIONS. In many instances this option may involve undesired administrative efforts. Therefore, the

(continued)

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TSTF-204  
REV B

BASES

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.8. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

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(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

TSTF-204  
REV B

B 3.8.8 Inverters—Shutdown

BASES

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BACKGROUND

A description of the inverters is provided in the Bases for LCO 3.8.7, "Inverters—Operating."

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APPLICABLE  
SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [14] (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC to AC inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the Reactor Protection System and Engineered Safety Features Actuation System (ESFAS) instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum inverters to each AC vital bus during MODES 5 and 6 ensures that:

- a. The unit can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate power is available to mitigate events postulated during shutdown, such as a fuel handling accident.

INSERT  
BASES →

The inverters were previously identified as part of the distribution system and, as such, satisfy Criterion 3 of the NRC Policy Statement.

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(continued)

TSTF-204 REV 3

BASES (continued)

LCO

The inverters ensure the availability of electrical power for the instrumentation for systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. The battery powered inverters provide an interruptible supply of AC electrical power to the AC vital buses even if the 4.16 kV safety buses are de-energized. OPERABILITY of the inverters requires that the vital bus be powered by the inverter. This ensures the availability of sufficient inverter power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

APPLICABILITY

The inverters required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies provide assurance that:

- a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core;
- b. Systems needed to mitigate a fuel handling accident are available;
- c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

Inverter requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.7.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If two trains are required by LCO 3.8.10, "Distribution Systems—Shutdown," the remaining OPERABLE inverters may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for positive reactivity

(continued)

TSTF-204  
REV 3

BASES

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

additions.] The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained. By the allowance of the option to declare required features inoperable with the associated inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power or powered from a constant voltage source transformer.

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

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(continued)

TSTF-204  
REV 3

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

LCO 3.8.5

DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

INSERT 3.8.5 →

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME |
|--|--|-----------------|
| A. One [or more] required DC electrical power subsystem[s] inoperable. | A.1.1 Declare affected required feature(s) inoperable.                               | Immediately     |
|  | <u>OR</u>  |                 |
|  | A.2.1 Suspend CORE ALTERATIONS.  | Immediately     |
|  | <u>AND</u>   |                 |
|  | A.2.2 Suspend movement of irradiated fuel assemblies.                                | Immediately     |
|  | <u>AND</u>   |                 |
|  | A.2.3 Initiate action to suspend operations involving positive reactivity additions. | Immediately     |
|  | <u>AND</u>   |                 |
|  |  | (continued)     |

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3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters—Shutdown

LCO 3.8.8

v

Inverters shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

v

INSERT 3.8.8 →

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME |  |
|--|--|-----------------|--|
| A. One [or more] [required] inverters] inoperable. | A.1 Declare affected required feature(s) inoperable.                                 | Immediately     |  |
|  | <u>OR</u>  |                 |  |
|  | A.2.1 Suspend CORE ALTERATIONS.  | Immediately     |  |
|  | <u>AND</u>   |                 |  |
|  | A.2.2 Suspend movement of irradiated fuel assemblies.                                | Immediately     |  |
|  | <u>AND</u>   |                 |  |
|  | A.2.3 Initiate action to suspend operations involving positive reactivity additions. | Immediately     |  |
|  | <u>AND</u>   |                 |  |
|  |  | (continued)     |  |

B 3.8 ELECTRICAL POWER SYSTEMS

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REV 3

B 3.8.5 DC Sources—Shutdown

BASES

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BACKGROUND

A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources—Operating."

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APPLICABLE SAFETY ANALYSES


The initial conditions of Design Basis Accident and transient analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [15] (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 5 and 6 and during movement of irradiated fuel assemblies ensures that:

- a. The unit can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident.

INSERT BASES



The DC sources satisfy Criterion 3 of the NRC Policy Statement.

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LCO

The DC electrical power subsystems, <sup>required</sup> [each subsystem consisting of two batteries, one battery charger per battery, and the corresponding control equipment and <sup>the required</sup>]

(continued)

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BASES

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LCO  
(continued)

interconnecting cabling within <sup>[one]</sup> the train, <sup>[is]</sup> ~~[are]~~ required to be OPERABLE to support ~~[required]~~ <sup>[one]</sup> train <sup>[is]</sup> of the distribution systems ~~[required OPERABLE by LCO 3.8.10, "Distribution Systems—Shutdown. ]]~~ This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

---

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies, provide assurance that:

- a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core;
- b. Required features needed to mitigate a fuel handling accident are available;
- c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The DC electrical power requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.4.

---

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

**[** If two trains are required by LCO 3.8.10, the remaining train with DC power available may be capable of supporting sufficient systems to allow continuation of CORE ALTERATIONS and fuel movement. **]** By allowing the option to declare required features inoperable with the associated DC power source(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCO ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the

(continued)

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**BASES**

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**ACTIONS**

A.1. A.2.1. A.2.2. A.2.3. and A.2.4 (continued)

allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

---

**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.8. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

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(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

TSTF-204  
REV 3.

B 3.8.8 Inverters—Shutdown

BASES

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BACKGROUND

A description of the inverters is provided in the Bases for LCO 3.8.7, "Inverters—Operating."

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APPLICABLE  
SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [15] (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC to AC inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the Reactor Protective System and Engineered Safety Features Actuation System instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum inverters to each AC vital bus during MODES 5 and 6 ensures that:

- a. The unit can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate power is available to mitigate events postulated during shutdown, such as a fuel handling accident.

INSERT  
BASES

The inverters were previously identified as part of the distribution system and, as such, satisfy Criterion 3 of the NRC Policy Statement.

(continued)

**BASES (continued)**

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**LCO**

The inverters ensure the availability of electrical power for the instrumentation for systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. The battery powered inverters provide an interruptible supply of AC electrical power to the AC vital buses even if the 4.16 kV safety buses are de-energized. OPERABILITY of the inverters requires that the AC vital bus be powered by the inverter. This ensures the availability of sufficient inverter power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

---

**APPLICABILITY**

The inverters required to be OPERABLE in MODES 5 and 6 and during movement of irradiated fuel assemblies provide assurance that:

- a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core;
- b. Systems needed to mitigate a fuel handling accident are available;
- c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

Inverter requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.7.

---

**ACTIONS**

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

[If two trains are required by LCO 3.8.10, "Distribution Systems—Shutdown," the remaining OPERABLE Inverters may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for positive reactivity additions.] By the allowance of the option to declare

(continued)

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REV 3

BASES

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ACTIONS

A.1. A.2.1. A.2.2. A.2.3. and A.2.4 (continued)

required features inoperable with the associated inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power or powered from a constant voltage source transformer.

---

SURVEILLANCE  
REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

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(continued)

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REV B-

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

LCO 3.8.5

V

DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

V

INSERT 3.8.5 →

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME |
|--|--|-----------------|
| A. One [or more] required DC electrical power subsystem[s] inoperable. | A.1 Declare affected required feature(s) inoperable.                                 | Immediately     |
|  | <u>OR</u>  |                 |
|  | A.2.1 Suspend CORE ALTERATIONS.  | Immediately     |
|  | <u>AND</u>   |                 |
|  | A.2.2 Suspend movement of irradiated fuel assemblies.                                | Immediately     |
|  | <u>AND</u>   |                 |
|  | A.2.3 Initiate action to suspend operations involving positive reactivity additions. | Immediately     |
|  | <u>AND</u>   |                 |
|  |  | (continued)     |

3.8 ELECTRICAL POWER SYSTEMS

TSTF-204  
REV B

3.8.8 Inverters—Shutdown

LCO 3.8.8

Y

Inverter(s) shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

V

INSERT 3.8.8 →

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| A. One [or more] [required] inverter[s] inoperable. | A.1 Declare affected required feature(s) inoperable.                                 | Immediately     |
|   | <u>OR</u>  |                 |
|   | A.2.1 Suspend CORE ALTERATIONS.  | Immediately     |
|   | <u>AND</u>   |                 |
|   | A.2.2 Suspend movement of irradiated fuel assemblies.                                | Immediately     |
|   | <u>AND</u>   |                 |
|   | A.2.3 Initiate action to suspend operations involving positive reactivity additions. | Immediately     |
|   | <u>AND</u>   |                 |
|   |  | (continued)     |

B 3.8 ELECTRICAL POWER SYSTEMS

TSTF-204  
REV 3

B 3.8.5 DC Sources—Shutdown

BASES

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**BACKGROUND** A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources—Operating."

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**APPLICABLE SAFETY ANALYSES** The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [15] (Ref. 2), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 5 and 6 and during movement of irradiated fuel assemblies ensures that:

- a. The unit can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident.

INSERT BASES

→ The DC sources satisfy Criterion 3 of the NRC Policy Statement.

---

LCO

The DC electrical power subsystems, <sup>required</sup> [each subsystem consisting of two batteries, one battery charger per battery, and the corresponding control equipment and interconnecting cabling within the train, <sup>the required</sup> [are] required to be [is]

(continued).

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BASES

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LCO  
(continued)

OPERABLE to support <sup>[one]</sup> [required] trains of distribution systems required [OPERABLE by LCO 3.8.10, "Distribution Systems—Shutdown."] This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

---

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies provide assurance that:

- a. Required features needed to mitigate a fuel handling accident are available;
- b. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- c. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The DC electrical power requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.4.

---

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

[If two trains are required per LCO 3.8.10, the remaining train with DC power available may be capable of supporting sufficient systems to allow continuation of CORE ALTERATIONS and fuel movement.] By allowing the option to declare required features inoperable with the associated DC power source(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCO ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). The Required Action to suspend positive reactivity additions does not preclude actions to

(continued)

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BASES

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

maintain or increase reactor vessel inventory, provided the required SDM is maintained.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 states that Surveillances required by SR 3.8.4.1 through SR 3.8.4.8 are applicable in these MODES. See the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

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REFERENCES

1. FSAR, Chapter [6].
  2. FSAR, Chapter [15].
- 
-

B 3.8 ELECTRICAL POWER SYSTEMS

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REV B

B 3.8.8 Inverters—Shutdown

BASES

---

**BACKGROUND** A description of the inverters is provided in the Bases for LCO 3.8.7, "Inverters—Operating."

---

**APPLICABLE SAFETY ANALYSES** The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [15] (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC to AC inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the Reactor Protective System and Engineered Safety Features Actuation System instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum inverters to each AC vital bus during MODES 5 and 6 ensures that:

- a. The unit can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate power is available to mitigate events postulated during shutdown, such as a fuel handling accident.

INSERT  
BASES

→ The inverters were previously identified as part of the distribution system and, as such, satisfy Criterion 3 of the NRC Policy Statement.

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(continued)

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BASES (continued)

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LCO

The inverters ensure the availability of electrical power for the instrumentation for systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. The battery powered inverters provide an uninterruptible supply of AC electrical power to the AC vital buses even if the 4.16 kV safety buses are de-energized. OPERABILITY of the inverters requires that the vital bus be powered by the inverter. This ensures the availability of sufficient inverter power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

---

APPLICABILITY

The inverters required to be OPERABLE in MODES 5 and 6 during movement of irradiated fuel assemblies provide assurance that:

- a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core;
- b. Systems needed to mitigate a fuel handling accident are available;
- c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

Inverter requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.7.

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

[ If two trains are required by LCO 3.8.10, "Distribution Systems—Shutdown," the remaining OPERABLE inverters may be capable of supporting sufficient required features to allow

(continued)

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REV B

BASES

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

continuation of CORE ALTERATIONS, fuel movement, operations with a potential for draining the reactor vessel, and operations with a potential for positive reactivity additions. The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained. By the allowance of the option to declare required features inoperable with the associated inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power or powered from a constant voltage source transformer.

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the

(continued)

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REV 3.

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

LCO 3.8.5

DC electrical power subsystems shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

INSERT 3.8.5 →

APPLICABILITY: MODES 4 and 5,  
During movement of irradiated fuel assemblies in the  
[secondary] containment.

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME |
|--|--|-----------------|
| A. One [or more] required DC electrical power subsystems [inoperable]. | A.1 Declare affected required feature(s) inoperable.                                 | Immediately     |
|  | <u>OR</u>  |                 |
|  | A.2.1 Suspend CORE ALTERATIONS.  | Immediately     |
|  | <u>AND</u>   |                 |
|  | A.2.2 Suspend movement of irradiated fuel assemblies in the [secondary] containment. | Immediately     |
|  | <u>AND</u>   |                 |
|  |  | (continued)     |

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3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters—Shutdown

LCO 3.8.8

Inverter(s) shall be OPERABLE to support the onsite Class IE AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

INSERT 3.8.8 →

APPLICABILITY: MODES 4 and 5,  
During movement of irradiated fuel assemblies in the [secondary] containment.

ACTIONS

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME |
|---|---|-----------------|
| A. One [or more] [required] inverter[s] inoperable. | A.1 Declare affected required feature(s) inoperable.  | Immediately     |
|   | <u>OR</u>   |                 |
|   | A.2.1 Suspend CORE ALTERATIONS.   | Immediately     |
|   | <u>AND</u>  |                 |
|   | A.2.2 Suspend handling of irradiated fuel assemblies in the [secondary] containment.          | Immediately     |
|   | <u>AND</u>  |                 |
|   | A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel. | Immediately     |
|   | <u>AND</u>  |                 |
|   |   | (continued)     |

B 3.8 ELECTRICAL POWER SYSTEMS

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REV 3

B 3.8.5 DC Sources—Shutdown

BASES

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BACKGROUND

A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources—Operating."

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APPLICABLE  
SAFETY ANALYSES


The initial conditions of Design Basis Accident and transient analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [15] (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators (DGs), emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 4 and 5 and during movement of irradiated fuel assemblies ensures that:

- a. The facility can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

INSERT  
BASES



The DC sources satisfy Criterion 3 of the NRC Policy Statement.

required] [the required]

LCO

The DC electrical power subsystems—with: 1) [each station service DC subsystem consisting of two 125 V batteries in series, two battery chargers, and the corresponding control

(continued)

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BASES

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required [the required]

LCO  
(continued)

[one]

[is] equipment and interconnecting cabling; and 2) [each] DG DC subsystem consisting of one battery bank, one battery charger, and the corresponding control equipment and interconnecting cabling—[are] required to be OPERABLE to support [required] DC distribution subsystems [required] OPERABLE by LCO 3.8.10, "Distribution Systems—Shutdown." [.]  
This requirement ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment provide assurance that:

- a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;
- b. Required features needed to mitigate a fuel handling accident are available;
- c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The DC electrical power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.4.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

[If more than one DC distribution subsystem is required according to LCO 3.8.10, the DC subsystems remaining OPERABLE with one or more DC power sources inoperable may be

(continued)



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**BASES**

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**ACTIONS**

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By allowance of the option to declare required features inoperable with associated DC power sources inoperable, appropriate restrictions are implemented in accordance with the affected system LCOs' ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

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**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.8. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must

(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

TSTF-204  
REV B

B 3.8.8 Inverters—Shutdown

BASES

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**BACKGROUND** A description of the inverters is provided in the Bases for LCO 3.8.7, "Inverters—Operating."

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**APPLICABLE SAFETY ANALYSES**


The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [15] (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC to AC inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the Reactor Protection System and Emergency Core Cooling Systems instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum inverters to each AC vital bus during MODES 4 and 5 ensures that:

- a. The facility can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability are available for monitoring and maintaining the unit status; and
- c. Adequate power is available to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

INSERT  
BASES



The inverters were previously identified as part of the Distribution System and, as such, satisfy Criterion 3 of the NRC Policy Statement.

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(continued)

TSTF-204 REV 3

BASES (continued)

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LCO

The inverter[s] ensure the availability of electrical power for the instrumentation for systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or postulated DBA. The battery powered inverter[s] provide an uninterruptible supply of AC electrical power to the AC vital buses even if the 4.16 kV safety buses are de-energized. OPERABLE inverter[s] require the AC vital bus be powered by the inverter through inverted DC voltage. This ensures the availability of sufficient inverter power sources to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

---

APPLICABILITY

The inverter[s] required to be OPERABLE in MODES 4 and 5 and also any time during movement of irradiated fuel assemblies in the [primary or secondary] containment provide assurance that:

- a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core in case of an inadvertent draindown of the reactor vessel;
- b. Systems needed to mitigate a fuel handling accident are available;
- c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

Inverter requirements for MODES 1, 2, and 3 are covered in LCO 3.8.7.

---

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

[If two divisions are required by LCO 3.8.10, "Distribution Systems—Shutdown," the remaining OPERABLE inverters may be

(continued)

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BASES

TSTF-20Y REV 3

ACTIONS

A.1. A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

capable of supporting sufficient required feature(s) to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By the allowance of the option to declare required feature(s) inoperable with the associated inverter(s) inoperable, appropriate restrictions are implemented in accordance with the affected required feature(s) of the LCOs' ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in the [primary or secondary] containment, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the plant safety systems may be without power or powered from a constant voltage source transformer.

SURVEILLANCE  
REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

(continued)

TSTF-204 REV 3

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

LCO 3.8.5

DC electrical power subsystem(s) shall be OPERABLE to support the electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

INSERT 3.8.8 →

APPLICABILITY: MODES 4 and 5,  
During movement of irradiated fuel assemblies in the [primary or secondary] containment.

ACTIONS

| CONDITION  | REQUIRED ACTION   | COMPLETION TIME |
|--|---|-----------------|
| A. One [or more] required DC electrical power subsystem[s] inoperable. | A.1 Declare affected required feature(s) inoperable.  | Immediately     |
|  | <u>OR</u>   |                 |
|  | A.2.1 Suspend CORE ALTERATIONS.   | Immediately     |
|  | <u>AND</u>  |                 |
|  | A.2.2 Suspend movement of irradiated fuel assemblies in the [primary or secondary] containment. | Immediately     |
|  | <u>AND</u>  |                 |
|  | A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel.   | Immediately     |
|  | <u>AND</u>  |                 |
|  |   | (continued)     |

TSTF-204 REV 3.

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters—Shutdown

LCO 3.8.8

v
v
 Inverter(s) shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

INSERT 3.8.8 →

APPLICABILITY: MODES 4 and 5,  
During movement of irradiated fuel assemblies in the  
[primary or secondary] containment.

ACTIONS

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME |
|---|---|-----------------|
| A. One [or more] [required] inverter[s] inoperable. | A.1 Declare affected required feature(s) inoperable.  | Immediately     |
|   | <u>OR</u>   |                 |
|   | A.2.1 Suspend CORE ALTERATIONS.   | Immediately     |
|   | <u>AND</u>  |                 |
|   | A.2.2 Suspend handling of irradiated fuel assemblies in the [primary or secondary] containment. | Immediately     |
|   | <u>AND</u>  |                 |
|   | A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel.   | Immediately     |
|   | <u>AND</u>  |                 |
|   |   | (continued)     |

TSTF-204 REV B

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources—Shutdown

BASES

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**BACKGROUND** A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources—Operating."

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**APPLICABLE SAFETY ANALYSES** The initial conditions of Design Basis Accident and transient analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [15] (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 4 and 5 and during movement of irradiated fuel assemblies ensures that:

- a. The facility can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

INSERT BASES →

The DC sources satisfy Criterion 3 of the NRC Policy Statement.

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**LCO** The DC electrical power subsystems, <sup>required</sup> [each consisting of <sup>the required</sup> [two] battery banks, [one or two] battery charger[s], and

(continued)

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TSTF-204 REV B

BASES

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LCO  
(continued)

the corresponding <sup>[one]</sup> control equipment and interconnecting cabling within the division, are required to be OPERABLE to support ~~required~~ <sup>[required]</sup> divisions of Distribution System <sup>[divisions]</sup> required OPERABLE by LCO 3.8.10, "Distribution Systems—Shutdown." This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

---

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the [primary or secondary containment] provide assurance that:

- a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;
- b. Required features needed to mitigate a fuel handling accident are available;
- c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The DC electrical power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.4.

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

[If more than one DC distribution subsystem is required according to LCO 3.8.10, the DC subsystems remaining OPERABLE with one or more DC power sources inoperable may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel.]

(continued)

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BASES

TSTF-204 REV B.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

By allowing the option to declare required features inoperable with associated DC power source(s) inoperable, appropriate restrictions are implemented in accordance with the affected system LCOs' ACTIONS. In many instances this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

SURVEILLANCE  
REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.8. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

(continued)

TSTF-204 REV B

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.8 Inverters—Shutdown

BASES

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**BACKGROUND** A description of the inverters is provided in the Bases for LCO 3.8.7, "Inverters—Operating."

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**APPLICABLE SAFETY ANALYSES** The initial conditions of Design Basis Accident (DBA) and transient accident analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [15] (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC to AC inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the Reactor Protection System and Emergency Core Cooling Systems instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum inverters to each AC vital bus during MODES 4 and 5 ensures that:

- a. The facility can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability are available for monitoring and maintaining the unit status; and
- c. Adequate power is available to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

INSERT BASES

The inverters were previously identified as part of the Distribution System and, as such, satisfy Criterion 3 of the NRC Policy Statement.

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(continued)

TSTF-204 REV B

BASES (continued)

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LCO

The inverters ensure the availability of electrical power for the instrumentation for systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or postulated DBA. The battery powered inverters provide uninterrupted supply of AC electrical power to the AC vital buses even if the 4.16 kV safety buses are de-energized. OPERABLE inverters require the AC vital bus be powered by the inverter through inverted DC voltage. This ensures the availability of sufficient inverter power sources to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

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APPLICABILITY

The inverters required to be OPERABLE in MODES 4 and 5 and also any time during movement of irradiated fuel assemblies in the [primary or secondary] containment provide assurance that:

- a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core in case of an inadvertent draindown of the reactor vessel;
- b. Systems needed to mitigate a fuel handling accident are available;
- c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

Inverter requirements for MODES 1, 2, and 3 are covered in LCO 3.8.7.

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If two divisions are required by LCO 3.8.10, "Distribution Systems—Shutdown," the remaining OPERABLE inverters may be

(continued)

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TSTF-204 REV 3.

BASES

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ACTIONS

A.1. A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

capable of supporting sufficient required feature(s) to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By the allowance of the option to declare required feature(s) inoperable with the associated inverter(s) inoperable, appropriate restrictions are implemented in accordance with the affected required feature(s) of the LCOs' ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in the [primary or secondary] containment, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the plant safety systems may be without power or powered from a constant voltage source transformer.

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

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(continued)

## Industry/TSTF Standard Technical Specification Change Traveler

### Modify Section 3.8 Mode restriction Notes

Classification: 3) Improve Specifications

NUREGs Affected:  1430  1431  1432  1433  1434

**Description:**

This change modifies mode restrictions on the performance of Surveillances in Specifications 3.8.1 and 3.8.4.

**Justification:**

The MODE restriction Notes on Surveillances in Specifications 3.8.1 and 3.8.4 are modified to allow performance of the Surveillances in the prohibited MODES in order to reestablish OPERABILITY.

The Surveillances are may either be fully or partially performed. See Insert 1 and Insert 2.

|                   |                  |                |                         |
|-------------------|------------------|----------------|-------------------------|
| Industry Contact: | Buschbaum, Denny | (254) 897-5851 | dbuschb1@tuelectric.com |
| NRC Contact:      | Tomlinson, Ed    | 301-314-3137   | ebt@nrc.gov             |

### Revision History

#### OG Revision 0

**Revision Status: Closed**

Revision Proposed by: WOG Mini-Group

Revision Description:  
Original Issue

#### Owners Group Review Information

Date Originated by OG: 19-Nov-96

Owners Group Comments  
(No Comments)

Owners Group Resolution: Approved Date: 19-Nov-96

#### TSTF Review Information

TSTF Received Date: 20-Nov-96 Date Distributed for Review 06-Jan-98

OG Review Completed:  BWO  WOG  CEOG  BWROG

**TSTF Comments:**

Originally distributed on 4/8/97.

CEOG Comments from 4/24/97: Applicable, accepts.

2/5/98 - Include the SRs of 3.8.4, Batteries, 3.8.4.6, 3.8.4.7, 3.8.4.8. Applicable to all OGs. Approved.

TSTF Resolution: Approved Date: 05-Feb-98

#### NRC Review Information

NRC Received Date: 29-May-98

NRC Comments:  
(No Comments)

1/11/00

**OG Revision 0****Revision Status: Closed**

Final Resolution: Superseded by Revision

Final Resolution Date:

**TSTF Revision 1****Revision Status: Closed**

Revision Proposed by: NRC

**Revision Description:**

Revised per NRC comments. Surveillance Note modified to state that the Surveillance may be performed to maintain or reestablish OPERABILITY, provide an assessment determines the safety of the plant is maintained or enhanced. The Bases for the Note are modified by the addition of the following: This restriction is further amplified to allow Surveillance performance, or portions thereof, to maintain or reestablish system or component OPERABILITY (e.g., post-maintenance testing), provided an assessment of the effects of performance in these MODES compared to the effects of a plant shutdown and startup demonstrate a safety benefit or safety neutral situation. Consideration shall be given to safety systems or components rendered inoperable during the testing and the potential to cause perturbations in the electrical distribution system.

**TSTF Review Information**

TSTF Received Date: 09-Jun-99

Date Distributed for Review 15-Jun-99

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 15-Jun-99

**NRC Review Information**

NRC Received Date: 23-Jun-99

NRC Comments:

8/4/99 - NRC comments: The proposal is rejected for the following reasons:

1. The language of proposed Insert 1 is not acceptable. The staff suggested wording to the effect that the SR could be conducted at power in order to reestablish OPERABILITY following corrective maintenance. As proposed, the wording of Insert 1 would allow performance of the SRs at any time because the purpose of SRs is to maintain OPERABILITY. The wording of Insert 1 must be changed to be more consistent with the staff's suggestion.
2. The language of Insert 2 is also not acceptable because it addresses maintaining OPERABILITY, or reestablishing OPERABILITY following maintenance. The staff suggested wording only addresses reestablishing OPERABILITY following corrective maintenance. In addition, the Bases should address the risks associated with performing specific surveillances at power in terms more closely related to the individual SR.
3. The TSTF has indicated that the proposed NOTE is applicable to all SRs in LCOs 3.8.1 and 3.8.4 that currently have a MODE restriction. There are some SRs that can not be performed at power under any conditions. The submittal should be revised to reflect this.
4. Comments on specific SRs is as follows:

1/11/00

**TSTF Revision 1****Revision Status: Closed**

SR 3.8.1.8 This SR may involve a momentary loss of offsite power. Consideration should be given regarding whether or not the plant can withstand a transient of this type. Based on the results, a determination should be made regarding whether or not the SR can be conducted at power. The Bases for this SR should reflect this.

SR 3.8.1.11 In the staff's view, this SR can not be performed at power. Performance of the SR requires deenergizing emergency busses, load shedding, and auto start of shutdown loads.

SR 3.8.1.12 This SR may be done at power provided an ESF actuation signal to the EDGs can be generated without causing any loads to shed or ESF loads to start. If conducting this SR at power causes any ESF loads to be inoperable, that inoperability must be evaluated.

SR 3.8.1.13 This SR may be done at power depending on plant design. The LOOP and LOCA signals must be generated to the EDGs without causing a loss of voltage on the emergency busses or causing any ESF loads to start. If conducting this SR at power causes any ESF loads to be inoperable, that inoperability must be evaluated.

SR 3.8.1.16 This SR requires paralleling EDGs with offsite, loading the EDGs, disconnecting the offsite, reparalleling with offsite power, unloading and disconnecting EDGs. It may be possible to conduct this SR at power provided an appropriate risk assessment is performed.

SR 3.8.1.17 It may be possible to conduct this SR at power depending on plant design. An ESF actuation signal must be generated without causing any ESF loads to start. If conducting this SR at power causes any ESF loads to be inoperable, that inoperability must be evaluated.

SR 3.8.1.18 How would this SR be accomplished at power? This SR requires providing a start signal to each ESF and shutdown load, and verifying the interval between signals is correct. However, it is not desirable for the actual loads to start. To accomplish this, it appears that the entire train/division associated with the sequencer must be disabled during performance of this test. This possibility is not addressed in the submittal.

SR 3.8.1.19 This SR can not be conducted at power. It requires deenergizing of emergency busses, load shedding, and energizing of permanently and auto connected loads.

SR 3.8.4.6 This SR can not be done at power. It requires disconnecting the charger from the battery which will result in DC subsystem inoperability and plant shutdown.

SR 3.8.4.7 & SR 3.8.4.8 These SRs can not be conducted at power. These SRs require disconnecting the battery from the DC subsystem which will result in DC subsystem inoperability and plant shutdown.

8/16/99 NRC comments - Recommendation to reject is changed to modify. This change is one of industry's key proposals that they feel very strongly about. It also appears that we have made some progress on coming closer to agreement and discussions should be held with the TSTF in an attempt to reach agreement. These discussions should include the EICB staff to ensure we can all agree on exact words.

8/31/99 - NRC comments.

1. Ed T stated the NRC always realized the entire SR may have to be performed at power
2. Ed T stated we went to far - there are some total SRs that can be performed at power and some SRs that cannot totally be performed at power but portions of the SR may be performed at power
3. Ed T/Jim L could accept the wording of two notes - 1 w/ "portions" for those SRs that cannot be performed at power and 1 w/o "portions" for those SRs that can be performed at power

1/11/00

**TSTF Revision 1****Revision Status: Closed**

4. Add the wording to the existing Bases Notes of "at power operation"

Final Resolution: Superseded by Revision

Final Resolution Date: 04-Aug-99

**TSTF Revision 2****Revision Status: Closed**

Revision Proposed by: TSTF

**Revision Description:**

Revised per NRC comments. The single Note was divided into two Notes to indicate there are allowances for full performance and partial performance of the affected SRs at power depending on the potential perturbations to the electric system.

**TSTF Review Information**

TSTF Received Date: 24-Sep-99

Date Distributed for Review 24-Sep-99

OG Review Completed:  BWO  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 30-Sep-99

**NRC Review Information**

NRC Received Date: 08-Oct-99

NRC Comments:

NRC requests changes.

Final Resolution: Superseded by Revision

Final Resolution Date:

**TSTF Revision 3****Revision Status: Active****Next Action: NRC**

Revision Proposed by: NRC

**Revision Description:**

Revised to incorporate the NRC requested changes to Bases Inserts 1 and 2 and the NRC request to change SR 3.8.1.12 and SR 3.8.1.17 from those Surveillances for which a "full performance" can be done to those which only a "partial performance" can be done.

**TSTF Review Information**

TSTF Received Date: 10-Jan-00

Date Distributed for Review 10-Jan-00

OG Review Completed:  BWO  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 10-Jan-00

**NRC Review Information**

NRC Received Date: 11-Jan-00

1/11/00



**TSTF Revision 3****Revision Status: Active****Next Action: NRC**

NRC Comments:

(No Comments)

Final Resolution: NRC Action Pending

Final Resolution Date:

**Incorporation Into the NUREGs**

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

**Affected Technical Specifications**

|                   |                        |
|-------------------|------------------------|
| SR 3.8.1.8        | AC Sources - Operating |
| SR 3.8.1.8 Bases  | AC Sources - Operating |
| SR 3.8.1.9        | AC Sources - Operating |
| SR 3.8.1.9 Bases  | AC Sources - Operating |
| SR 3.8.1.10       | AC Sources - Operating |
| SR 3.8.1.10 Bases | AC Sources - Operating |
| SR 3.8.1.11       | AC Sources - Operating |
| SR 3.8.1.11 Bases | AC Sources - Operating |
| SR 3.8.1.12       | AC Sources - Operating |
| SR 3.8.1.12 Bases | AC Sources - Operating |
| SR 3.8.1.13       | AC Sources - Operating |
| SR 3.8.1.13 Bases | AC Sources - Operating |
| SR 3.8.1.14       | AC Sources - Operating |
| SR 3.8.1.14 Bases | AC Sources - Operating |
| SR 3.8.1.16       | AC Sources - Operating |
| SR 3.8.1.16 Bases | AC Sources - Operating |
| SR 3.8.1.17       | AC Sources - Operating |
| SR 3.8.1.17 Bases | AC Sources - Operating |
| SR 3.8.1.18       | AC Sources - Operating |

1/11/00

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|                   |                        |
|-------------------|------------------------|
| SR 3.8.1.18 Bases | AC Sources - Operating |
| SR 3.8.1.19       | AC Sources - Operating |
| SR 3.8.1.19 Bases | AC Sources - Operating |
| SR 3.8.4.6        | DC Sources - Operating |
| SR 3.8.4.6 Bases  | DC Sources - Operating |
| SR 3.8.4.7        | DC Sources - Operating |
| SR 3.8.4.7 Bases  | DC Sources - Operating |
| SR 3.8.4.8        | DC Sources - Operating |
| SR 3.8.4.8 Bases  | DC Sources - Operating |

---

INSERT 1

However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.

BASES INSERT 1

This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

INSERT 2

However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.

BASES INSERT 2

This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY          |
|--|--------------------|
| <p>SR 3.8.1.7</p> <p>-----NOTE-----<br/>All DG starts may be preceded by an engine prelube period.<br/>-----</p> <p>Verify each DG starts from standby condition and achieves, in <math>\leq</math> [10] seconds, voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V, and frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p>                    | <p>184 days</p>    |
| <p>SR 3.8.1.8</p> <p>-----NOTE----- <i>normally</i><br/>This Surveillance shall not be performed in MODE 1 or 2. However, <i>credit</i> may be taken for unplanned events that satisfy this SR.<br/>-----</p> <p><i>Insert 1</i></p> <p>Verify [automatic [and] manual] transfer of AC power sources from the normal offsite circuit to each alternate [required] offsite circuit.</p> | <p>[18 months]</p> |

(continued)

**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY          |
|---|--------------------|
| <p>SR 3.8.1.9</p> <p><i>Insert 1</i></p> <p>-----NOTES----- <i>normally</i></p> <p>1. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor <math>\leq</math> [0.9].</p> <p>-----</p> <p>Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and:</p> <p>a. Following load rejection, the frequency is <math>\leq</math> [63] Hz;</p> <p>b. Within [3] seconds following load rejection, the voltage is <math>\geq</math> [3740] V and <math>\leq</math> [4580] V; and</p> <p>c. Within [3] seconds following load rejection, the frequency is <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p> | <p>[18 months]</p> |
| <p>SR 3.8.1.10</p> <p><i>Insert 1</i></p> <p>-----NOTE----- <i>normally</i></p> <p>This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify each DG operating at a power factor <math>\leq</math> [0.9] does not trip, and voltage is maintained <math>\leq</math> [5000] V during and following a load rejection of <math>\geq</math> [4500] kW and <math>\leq</math> [5000] kW.</p>  | <p>[18 months]</p> |

(continued)

TSTF -283, Rev 3?

**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY          |
|---|--------------------|
| <p>SR 3.8.1.11</p> <p>-----NOTES-----</p> <p>1. All DG starts may be preceded by an engine prelube period. <i>normally</i></p> <p>2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. <i>Insert 2</i><br/>However, credit may be taken for unplanned events that satisfy this SR.</p>  |                    |
| <p>Verify on an actual or simulated loss of offsite power signal:</p> <p>a. De-energization of emergency buses;</p> <p>b. Load shedding from emergency buses; and</p> <p>c. DG auto-starts from standby condition and:</p> <ol style="list-style-type: none"> <li>1. energizes permanently connected loads in <math>\leq</math> [10] seconds,</li> <li>2. energizes auto-connected shutdown load through [automatic load sequencer],</li> <li>3. maintains steady-state voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V,</li> <li>4. maintains steady-state frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz, and</li> <li>5. supplies permanently connected and auto-connected shutdown loads for <math>\geq</math> 5 minutes.</li> </ol> | <p>[18 months]</p> |

(continued)

TSTF-283, Rev 3

**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY  |
|---|--|
| <p>SR 3.8.1.12</p> <p>-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period.</li> <li>2. This Surveillance shall not be <sup>normally</sup> performed in MODE 1 or 2. However, <sup>credit</sup> may be taken for unplanned events that satisfy this SR.</li> </ol> <p>Verify on an actual or simulated [Engineered Safety Feature (ESF)] actuation signal each DG auto-starts from standby condition and:</p> <ol style="list-style-type: none"> <li>a. In <math>\leq</math> [12] seconds after auto-start and during tests, achieves voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V;</li> <li>b. In <math>\leq</math> [12] seconds after auto-start and during tests, achieves frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz;</li> <li>c. Operates for <math>\geq</math> 5 minutes;</li> <li>d. Permanently connected loads remain energized from the offsite power system; and</li> <li>e. Emergency loads are energized [or auto-connected through the automatic load sequencer] from the offsite power system.</li> </ol> | <p style="text-align: center;">[Insert]</p> <p style="text-align: center;">[18 months]</p> |

(continued)



TSTF-283, Rev 3

**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY          |
|--|--------------------|
| <p>SR 3.8.1.13</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><i>Insert!</i></p> <p style="text-align: center;">NOTE <span style="float: right;"><i>normally</i></span></p> <p>This Surveillance shall not be performed in MODE 1 or 2. However, <i>credit</i> may be taken for unplanned events that satisfy this SR.</p> </div> <p>Verify each DG automatic trip is bypassed on [actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal] except:</p> <ol style="list-style-type: none"> <li>a. Engine overspeed; [and]</li> <li>b. Generator differential current[;</li> <li>c. Low lube oil pressure;</li> <li>d. High crankcase pressure; and</li> <li>e. Start failure relay].</li> </ol> | <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.8.1.14 -----NOTES-----</p> <p>1. Momentary transients outside the load and power factor ranges do not invalidate this test.</p> <p>2. This Surveillance shall not be <sup>normally</sup> performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify each DG operating at a power factor <math>\leq [0.9]</math> operates for <math>\geq 24</math> hours:</p> <p>a. For <math>\geq [2]</math> hours loaded <math>\geq [5250]</math> kW and <math>\leq [6000]</math> kW; and</p> <p>b. For the remaining hours of the test loaded <math>\geq [4500]</math> kW and <math>\leq [5000]</math> kW.</p> | <p style="text-align: center;">Insert 1</p> <p style="text-align: center;">[18 months]</p> |
| <p>SR 3.8.1.15 -----NOTES-----</p> <p>1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated <math>\geq [2]</math> hours loaded <math>\geq [4500]</math> kW and <math>\leq [5000]</math> kW.</p> <p>Momentary transients outside of load range do not invalidate this test.</p> <p>2. All DG starts may be preceded by an engine prelude period.</p> <p>-----</p> <p>Verify each DG starts and achieves, in <math>\leq [10]</math> seconds, voltage <math>\geq [3740]</math> V and <math>\leq [4580]</math> V, and frequency <math>\geq [58.8]</math> Hz and <math>\leq [61.2]</math> Hz.</p>                          | <p style="text-align: center;">[18 months]</p>   |

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE  | FREQUENCY                                 |
|---|---|
| <p>SR 3.8.1.16</p> <p>-----NOTE----- <i>normally</i><br/> This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify each DG:</p> <ul style="list-style-type: none"> <li>a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;</li> <li>b. Transfers loads to offsite power source; and</li> <li>c. Returns to ready-to-load operation.</li> </ul>                   | <p><i>Insert 1</i></p> <p>[18 months]</p> |
| <p>SR 3.8.1.17</p> <p>-----NOTE----- <i>normally</i><br/> This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify, with a DG operating in test mode and connected to its bus, an actual or simulated ESF actuation signal overrides the test mode by:</p> <ul style="list-style-type: none"> <li>a. Returning DG to ready-to-load operation[; and</li> <li>b. Automatically energizing the emergency load from offsite power].</li> </ul> | <p><i>Insert 2</i></p> <p>[18 months]</p> |

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE  | FREQUENCY  |
|---|--|
| <p>SR 3.8.1.18</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">NOTE <span style="float: right; border: 1px solid black; border-radius: 50%; padding: 2px;">normally</span></p> <p>This Surveillance shall <del>not</del> be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</p> </div> <p>Verify interval between each sequenced load block is within <math>\pm</math> [10% of design interval] for each emergency [and shutdown] load sequencer.</p> | <p style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 5px; width: fit-content; margin: 0 auto;">Insert!</p> <p>[18 months]</p> |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE  | FREQUENCY          |
|---|--------------------|
| <p>SR 3.8.1.19 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period. <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">normally</span></li> <li>2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Insert 2</span></li> </ol> <p>Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal:</p> <ol style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses;</li> <li>c. DG auto-starts from standby condition and:               <ol style="list-style-type: none"> <li>1. energizes permanently connected loads in <math>\leq</math> [10] seconds,</li> <li>2. energizes auto-connected emergency loads through [load sequencer],</li> <li>3. achieves steady-state voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V,</li> <li>4. achieves steady-state frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz, and</li> <li>5. supplies permanently connected and auto-connected emergency loads for <math>\geq</math> [5] minutes.</li> </ol> </li> </ol> | <p>[18 months]</p> |

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY                                 |
|--|---|
| <p>SR 3.8.4.6</p> <p>-----NOTE----- <i>normally</i></p> <p>This Surveillance shall not be performed in MODE 1, 2, 3, or 4. <del>However, credit may be taken for unplanned events that satisfy this SR.</del></p> <p>-----</p> <p>Verify each battery charger supplies<br/>≥ [400] amps at ≥ [125/250] V for<br/>≥ [8] hours.</p>  | <p><i>Insert 2</i></p> <p>[18 months]</p> |
| <p>SR 3.8.4.7</p> <p>-----NOTES-----</p> <ol style="list-style-type: none"> <li>The modified performance discharge test in SR 3.8.4.8 may be performed in lieu of the service test in SR 3.8.4.7 once per 60 months.</li> <li>This Surveillance shall not be performed in MODE 1, 2, 3, or 4. <i>normally</i><br/><del>However, credit may be taken for unplanned events that satisfy this SR.</del></li> </ol> <p>-----</p> <p>Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.</p> | <p><i>Insert 2</i></p> <p>[18 months]</p> |

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.8.4.8</p> <p>----- NOTE ----- <u>normally</u> -----</p> <p>This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, <u>credit</u> may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify battery capacity is <math>\geq</math> [80]% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.</p> | <p><u>Insert 2</u></p> <p>60 months</p> <p><u>AND</u></p> <p>12 months when battery shows degradation, or has reached [85]% of the expected life with capacity &lt; 100% of manufacturer's rating</p> <p><u>AND</u></p> <p>24 months when battery has reached [85]% of the expected life with capacity <math>\geq</math> 100% of manufacturer's rating</p> |

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BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.6 (continued)

The Frequency for this SR is variable, depending on individual system design, with up to a [92] day interval. The [92] day Frequency corresponds to the testing requirements for pumps as contained in the ASME Code, Section XI (Ref. 12); however, the design of fuel transfer systems is such that pumps will operate automatically or must be started manually in order to maintain an adequate volume of fuel oil in the day [and engine mounted] tanks during or following DG testing. In such a case, a 31 day Frequency is appropriate. Since proper operation of fuel transfer systems is an inherent part of DG OPERABILITY, the Frequency of this SR should be modified to reflect individual designs.

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Transfer of each [4.16 kV ESF bus] power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads. The [18 month] Frequency of the Surveillance is based on engineering judgment, taking into consideration the unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

BASES  
INSERT 1

(continued)



TSTF-283, Rev B

BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.9 (continued)

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR. In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, Note 2 requires that, if synchronized to offsite power, testing must be performed using a power factor  $\leq [0.9]$ . This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

Bases  
Insert 1

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;
- b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and
- c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. The DG full load rejection may occur because of a system fault or inadvertent breaker tripping. This Surveillance ensures proper engine generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG will not trip upon loss of the load. These

(continued)

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BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.10 (continued)

acceptance criteria provide DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application, including reconnection to the bus if the trip initiator can be corrected or isolated.

In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing must be performed using a power factor  $\leq [0.9]$ . This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9) and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbation to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems.

Bases  
Insert 1

Credit may be taken for unplanned events that satisfy this SR.

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;
- b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and
- c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

(continued)

BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.11 (continued)

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

Bases  
Insert 2

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts and achieves the required voltage and frequency within the specified time ([10] seconds) from the design basis actuation signal (LOCA signal) and operates for  $\geq 5$  minutes. The 5 minute period provides sufficient time to demonstrate stability. SR 3.8.1.12.d and SR 3.8.1.12.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on an ESF signal without loss of offsite power.

The requirement to verify the connection of permanent and auto-connected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads can not actually be connected or loaded without undue hardship or potential for undesired operation. For instance, ECCS injection valves are not desired to be stroked open, high pressure injection systems are not capable of being operated at full flow, or DHR systems performing a DHR function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

(continued)

BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.12 (continued)

The Frequency of [18 months] takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.13

*Bases Insert 2*

This Surveillance demonstrates that DG noncritical protective functions (e.g., high jacket water temperature) are bypassed on a loss of voltage signal concurrent with an ESF actuation test signal, and critical protective functions (engine overspeed, generator differential current[, low lube oil pressure, high crankcase pressure, and start failure relay]) trip the DG to avert substantial damage to the DG unit. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

The [18 month] Frequency is based on engineering judgment, taking into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has

(continued)

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BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.13 (continued)

shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

Bases  
Insert 1

The SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DG from service. Credit may be taken for unplanned events that satisfy this SR.

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;
- b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and
- c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

SR 3.8.1.14

Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3), requires demonstration once per 18 months that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours,  $\geq$  [2] hours of which is at a load equivalent to 110% of the continuous duty rating and the remainder of the time at a load equivalent to the continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

(continued)

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BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.14 (continued)

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor of  $\leq [0.9]$ . This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience. The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections, in accordance with vendor recommendations, in order to maintain DG OPERABILITY.

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 7), paragraph 2.a.(3), takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by two Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.15

*Bases Insert 1*

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within [10 seconds]. The [10 second] time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(5).

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown

(continued)

BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.15 (continued)

inspections, in accordance with vendor recommendations, in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least [2] hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

SR 3.8.1.16

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and the DG can be returned to ready to load status when offsite power is restored. It also ensures that the auto-start logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the output breaker is open and can receive and auto-close signal on bus undervoltage, and the load sequence timers are reset.

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.

Basics  
Insert 1

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing and the DG will automatically reset to ready to load operation if a LOCA actuation signal is received during operation in the test

(continued)

BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.17 (continued)

mode. Ready to load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2).

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirement associated with SR 3.8.1.17.b is to show that the emergency loading was not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(8), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.18

*Bases Inert 2*

Under accident [and loss of offsite power] conditions loads are sequentially connected to the bus by the [automatic load sequencer]. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The [10]% load sequence time interval tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses.

(continued)



BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.18 (continued)

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

Bases  
Insert 1

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;
- b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and
- c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

SR 3.8.1.19

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.11, during a loss of offsite power actuation test signal in conjunction with an ESF actuation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these

(continued)

BASES

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**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.1.19 (continued)

functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of [18 months] takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of [18 months].

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations for DGs. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.1.20

This Surveillance demonstrates that the DG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed within the specified time when the DGs are started simultaneously.

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9).

This SR is modified by a Note. The reason for the Note is to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated, and temperature maintained consistent with manufacturer recommendations.

(continued)

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BASES

**SURVEILLANCE  
REQUIREMENTS**  
(continued)

SR 3.8.4.6

This SR requires that each battery charger be capable of supplying [400] amps and [250/125] V for  $\geq$  [8] hours. These requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 10), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensure that these requirements can be satisfied.

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these [18 month] intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.4.7

A battery service test is a special test of the battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 10) and Regulatory Guide 1.129 (Ref. 11), which state that the battery service test should be performed during refueling operations, or at some other outage, with intervals between tests not to exceed [18 months].

This SR is modified by two Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test once per 60 months.

(continued)

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BASES

**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.4.7 (continued)

The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

A modified discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test.

The reason for Note 2 is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.4.8

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.7. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.8; however, only the modified performance discharge test may be used to satisfy

(continued)

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BASES

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**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.4.8 (continued)

SR 3.8.4.8 while satisfying the requirements of SR 3.8.4.7 at the same time.

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 9) and IEEE-485 (Ref. 5). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity  $\geq$  100% of the manufacturer's ratings. Degradation is indicated, according to IEEE-450 (Ref. 9), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is  $\geq$  [10%] below the manufacturer's rating. These Frequencies are consistent with the recommendations in IEEE-450 (Ref. 9). Bases Insert 2

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

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REFERENCES

1. 10 CFR.50, Appendix A, GDC 17.
2. Regulatory Guide 1.6, March 10, 1971.
3. IEEE-308-[1978].
4. FSAR, Chapter [8].
5. IEEE-485-[1983], June 1983.

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY  |
|---|--|
| <p>SR 3.8.1.7</p> <p>-----NOTE-----<br/>All DG starts may be preceded by an engine prelube period.</p> <p>-----</p> <p>Verify each DG starts from standby condition and achieves in <math>\leq</math> [10] seconds, voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V, and frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p> | <p>184 days</p>                                    |
| <p>SR 3.8.1.8</p> <p>-----NOTE-----<br/>This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify [automatic [and] manual] transfer of AC power sources from the normal offsite circuit to each alternate [required] offsite circuit.</p>                           | <p>Normally</p> <p>Insert 1</p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.1.9</p> <p style="text-align: center;">NOTES <i>(Normally)</i></p> <p>1. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor <math>\leq</math> [0.9].</p> <hr/> <p>Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and:</p> <p>a. Following load rejection, the frequency is <math>\leq</math> [63] Hz;</p> <p>b. Within [3] seconds following load rejection, the voltage is <math>\geq</math> [3740] V and <math>\leq</math> [4580] V; and</p> <p>c. Within [3] seconds following load rejection, the frequency is <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p> | <p style="text-align: center;"><i>Insert 1</i></p> <p>[18 months]</p> |
| <p>SR 3.8.1.10</p> <p style="text-align: center;">NOTE <i>(Normally)</i></p> <p>This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> <hr/> <p>Verify each DG operating at a power factor <math>\leq</math> [0.9] does not trip and voltage is maintained <math>\leq</math> [5000] V during and following a load rejection of <math>\geq</math> [4500] kW and <math>\leq</math> [5000] kW.</p>   | <p style="text-align: center;"><i>Insert 1</i></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.8.1.11</p> <p style="text-align: center;">-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period. <i>Normally</i></li> <li>2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. <i>However,</i> credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p style="text-align: center;">-----</p> <p>Verify on an actual or simulated loss of offsite power signal:</p> <ol style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses;</li> <li>c. DG auto-starts from standby condition and:               <ol style="list-style-type: none"> <li>1. energizes permanently connected loads in <math>\leq</math> [10] seconds,</li> <li>2. energizes auto-connected shutdown loads through [automatic load sequencer],</li> <li>3. maintains steady state voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V,</li> <li>4. maintains steady state frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz, and</li> <li>5. supplies permanently connected [and auto-connected] shutdown loads for <math>\geq</math> 5 minutes.</li> </ol> </li> </ol> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |

(continued)



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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.1.12</p> <p style="text-align: center;">-----NOTES-----</p> <p>1. All DG starts may be preceded by prelube period. <i>Normally</i></p> <p>2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal each DG auto-starts from standby condition and:</p> <p>a. In <math>\leq</math> [10] seconds after auto-start and during tests, achieves voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V;</p> <p>b. In <math>\leq</math> [10] seconds after auto-start and during tests, achieves frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz;</p> <p>c. Operates for <math>\geq</math> 5 minutes;</p> <p>d. Permanently connected loads remain energized from the offsite power system; and</p> <p>e. Emergency loads are energized [or auto-connected through the automatic load sequencer] from the offsite power system.</p> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY  |
|---|--|
| <p style="text-align: right; margin-right: 100px;">(Normally)</p> <p>SR 3.8.1.13</p> <div style="border: 1px dashed black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;">NOTE</p> <p>This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> </div> <p>Verify each DG's automatic trips are bypassed on [actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal] except:</p> <ul style="list-style-type: none"> <li>a. Engine overspeed; [and]</li> <li>b. Generator differential current;</li> <li>c. [Low lube oil pressure;]</li> <li>d. [High crankcase pressure;] and</li> <li>e. [Start failure relay].</li> </ul> | <p style="text-align: center; font-size: 1.5em;">Insert 1</p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.8.1.14 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. Momentary transients outside the load and power factor ranges do not invalidate this test. <i>Normally</i></li> <li>2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p>-----</p> <p>Verify each DG operating at a power factor <math>\leq</math> [0.9] operates for <math>\geq</math> 24 hours:</p> <ol style="list-style-type: none"> <li>a. For <math>\geq</math> [2] hours loaded <math>\geq</math> [5250] kW and <math>\leq</math> [5500] kW; and</li> <li>b. For the remaining hours of the test loaded <math>\geq</math> [4500] kW and <math>\leq</math> [5000] kW.</li> </ol> | <p style="text-align: center;"><i>Insert 1</i></p> <p>[18 months]</p> |
| <p>SR 3.8.1.15 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated <math>\geq</math> [2] hours loaded <math>\geq</math> [4500] kW and <math>\leq</math> [5000] kW.</li> </ol> <p>Momentary transients outside of load range do not invalidate this test.</p> <ol style="list-style-type: none"> <li>2. All DG starts may be preceded by an engine prelube period.</li> </ol> <p>-----</p> <p>Verify each DG starts and achieves, in <math>\leq</math> [10] seconds, voltage <math>\geq</math> [3740] V, and <math>\leq</math> [4580] V and frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p>                          | <p>[18 months]</p>  |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.1.16</p> <p style="text-align: center;">-----NOTE----- <i>Normally</i></p> <p>This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify each DG:</p> <ul style="list-style-type: none"> <li>a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;</li> <li>b. Transfers loads to offsite power source; and</li> <li>c. Returns to ready-to-load operation.</li> </ul>                       | <p style="text-align: center;"><i>Insert 1</i></p> <p>[18 months]</p> |
| <p>SR 3.8.1.17</p> <p style="text-align: center;">-----NOTE----- <i>Normally</i></p> <p>This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify, with a DG operating in test mode and connected to its bus, an actual or simulated ESF actuation signal overrides the test mode by:</p> <ul style="list-style-type: none"> <li>a. Returning DG to ready-to-load operation [; and</li> <li>b. Automatically energizing the emergency load from offsite power].</li> </ul> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY  |
|---|--|
| <p>SR 3.8.1.18</p> <p style="text-align: center;">NOTE <sup>Normally</sup></p> <p>This Surveillance shall not be performed in MODE 1, 2, 3, or 4. <del>However, credit</del> may be taken for unplanned events that satisfy this SR.</p> <p>Verify interval between each sequenced load block is within <math>\pm</math> [10% of design interval] for each emergency [and shutdown] load sequencer.</p>   | <p style="text-align: center;">Insert 1</p> <p>[18 months]</p>   |
| <p>SR 3.8.1.19</p> <p style="text-align: center;">NOTES</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period. <sup>Normally</sup></li> <li>2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. <del>However, credit</del> may be taken for unplanned events that satisfy this SR.</li> </ol> <p>Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal:</p> <ol style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses; and</li> <li>c. DG auto-starts from standby condition and:             <ol style="list-style-type: none"> <li>1. energizes permanently connected loads in <math>\leq</math> [10] seconds,</li> </ol> </li> </ol> | <p style="text-align: center;">Insert 2</p> <p>[18 months]</p> <p style="text-align: right;">(continued)</p> |

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.8.4.6</p> <p style="text-align: center;">-----NOTE----- <i>Normally</i></p> <p>This Surveillance shall <del>not</del> be performed in MODE 1, 2, 3, or 4. <del>However,</del> credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify each battery charger supplies <math>\geq</math> [400] amps at <math>\geq</math> [125] V for <math>\geq</math> [8] hours.</p>   | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |
| <p>SR 3.8.4.7</p> <p style="text-align: center;">-----NOTES-----</p> <p>1. The modified performance discharge test in SR 3.8.4.8 may be performed in lieu of the service test in SR 3.8.4.7 once per 60 months.</p> <p>2. This Surveillance shall <del>not</del> be performed in MODE 1, 2, 3, or 4. <del>However,</del> credit may be taken for unplanned events that satisfy this SR. <i>Normally</i></p> <p>-----</p> <p>Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.</p> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.4.8</p> <p>-----NOTE-----<br/>           This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify battery capacity is <math>\geq</math> [80]% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.</p> | <p style="text-align: center;"><u>Insert 2</u></p> <p>60 months</p> <p><u>AND</u></p> <p>12 months when battery shows degradation or has reached [85]% of expected life with capacity &lt; 100% of manufacturer's rating</p> <p><u>AND</u></p> <p>24 months when battery has reached [85]% of the expected life with capacity <math>\geq</math> 100% of manufacturer's rating</p> |

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REQUIREMENTS**

SR 3.8.1.6 (continued)

Section XI (Ref. 11); however, the design of fuel transfer systems is such that pumps operate automatically or must be started manually in order to maintain an adequate volume of fuel oil in the day [and engine mounted] tanks during or following DG testing. In such a case, a 31 day Frequency is appropriate. Since proper operation of fuel transfer systems is an inherent part of DG OPERABILITY, the Frequency of this SR should be modified to reflect individual designs.

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Transfer of each [4.16 kV ESF bus] power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads. The [18 month] Frequency of the Surveillance is based on engineering judgment, taking into consideration the unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note. The reason for the Note is that, during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 1*

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine

(continued)



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REQUIREMENTS**

**SR 3.8.1.9 (continued)**

overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. [For this unit, the single load for each DG and its horsepower rating is as follows:] This Surveillance may be accomplished by:

- a. Tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest post-accident load while paralleled to offsite power, or while solely supplying the bus; or
- b. Tripping its associated single largest post-accident load with the DG solely supplying the bus.

As required by IEEE-308 (Ref. 12), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The 3 seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9).

This SR is modified by two Notes. The reason for Note 1 is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR. In order to ensure that the DG is tested under load

*Bases Insert 1*

(continued)

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SR 3.8.1.10 (continued)

In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing must be performed using a power factor  $\leq [0.9]$ . This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9) and is intended to be consistent with expected fuel cycle lengths.

This SR has been modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbation to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Basics Insert 1*

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;
- b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and
- c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

SR 3.8.1.11

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(1), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions

(continued)

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SR 3.8.1.11 (continued)

consistent with manufacturer recommendations. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts and achieves the required voltage and frequency within the specified time ([10] seconds) from the design basis actuation signal (LOCA signal) and operates for  $\geq 5$  minutes. The 5 minute period provides sufficient time to demonstrate stability. SR 3.8.1.12.d and SR 3.8.1.12.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on an ESF signal without loss of offsite power.

The requirement to verify the connection of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, ECCS injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, or RHR systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of [18 months] takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

(continued)

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SR 3.8.1.12 (continued)

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.1.13

This Surveillance demonstrates that DG noncritical protective functions (e.g., high jacket water temperature) are bypassed on a loss of voltage signal concurrent with an ESF actuation test signal, and critical protective functions (engine overspeed, generator differential current, [low lube oil pressure, high crankcase pressure, and start failure relay]) trip the DG to avert substantial damage to the DG unit. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

The [18 month] Frequency is based on engineering judgment, taking into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

The SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DG from service. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 1*

(continued)

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SR 3.8.1.14 (continued)

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by two Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Base Insert 1*

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within [10] seconds. The [10] second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(5).

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least [2] hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

(continued)

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(continued)**

SR 3.8.1.16

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and the DG can be returned to ready to load status when offsite power is restored. It also ensures that the autostart logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on bus undervoltage, and the load sequence timers are reset.

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.17

*Bases Insert!*

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing and the DG will automatically reset to ready to load operation if a LOCA actuation signal is received during operation in the test mode. Ready to load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2).

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirement associated with SR 3.8.1.17.b is to show that the emergency loading was not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable.

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SR 3.8.1.17 (continued)

This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(8), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.1.18

Under accident [and loss of offsite power] conditions loads are sequentially connected to the bus by the [automatic load sequencer]. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The [10]% load sequence time interval tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses.

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

(continued)

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SR 3.8.1.19 (continued)

the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations for DGs. The reason for Note 2 is that the performance of the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

Basics Inert 2

SR 3.8.1.20

This Surveillance demonstrates that the DG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed within the specified time when the DGs are started simultaneously.

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9).

This SR is modified by a Note. The reason for the Note is to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations.

Diesel Generator Test Schedule

The DG test schedule (Table 3.8.1-1) implements the recommendations of Revision 3 to Regulatory Guide 1.9 (Ref. 3). The purpose of this test schedule is to provide timely test data to establish a confidence level associated with the goal to maintain DG reliability > 0.95 per demand.

According to Regulatory Guide 1.9, Revision 3 (Ref. 3), each DG should be tested at least once every 31 days. Whenever a DG has experienced 4 or more valid failures in the last 25 valid tests, the maximum time between tests is reduced to 7 days. Four failures in 25 valid tests is a failure rate of 0.16, or the threshold of acceptable DG performance, and

(continued)



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REQUIREMENTS**  
(continued)

SR 3.8.4.6

This SR requires that each battery charger be capable of supplying [400] amps and [125] V for  $\geq$  [8] hours. These requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 10), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these [18 month] intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

This Surveillance is required to be performed during MODES 5 and 6 since it would require the DC electrical power subsystem to be inoperable during performance of the test.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.4.7

A battery service test is a special test of battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 10) and Regulatory Guide 1.129 (Ref. 11), which state that the battery service test should be performed during refueling operations or at some other outage, with intervals between tests, not to exceed [18 months].

(continued)

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REQUIREMENTS**

SR 3.8.4.7 (continued)

This SR is modified by two Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test once per 60 months.

The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

A modified discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test.

The reason for Note 2 is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.4.8

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

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**SR 3.8.4.8 (continued)**

A battery modified performance discharge test is described in the Bases for SR 3.8.4.7. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.8; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.8 while satisfying the requirements of SR 3.8.4.7 at the same time.

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 9) and IEEE-485 (Ref. 5). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity  $\geq$  100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 (Ref. 9), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is  $\geq$  [10%] below the manufacturer's rating. These Frequencies are consistent with the recommendations in IEEE-450 (Ref. 9).

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

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**REFERENCES**

1. 10 CFR 50, Appendix A, GDC 17.
2. Regulatory Guide 1.6, March 10, 1971.
3. IEEE-308-[1978].

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY                          |
|--|------------------------------------|
| <p>SR 3.8.1.7</p> <p>-----NOTE-----<br/>All DG starts may be preceded by an engine prelube period.</p> <p>-----</p> <p>Verify each DG starts from standby condition and achieves, in <math>\leq</math> [10] seconds, voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V, and frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p> | <p>184 days</p>                    |
| <p>SR 3.8.1.8</p> <p>-----NOTE-----<br/>This Surveillance shall not be performed in MODE 1 or 2. <sup>Normally</sup> However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify [automatic [and] manual] transfer of AC power sources from the normal offsite circuit to each alternate [required] offsite circuit.</p>        | <p>Insert 1</p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.1.9</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">NOTES <sup>Normally</sup></p> <p>1. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor <math>\leq</math> [0.9].</p> </div> <p>Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and:</p> <ol style="list-style-type: none"> <li>a. Following load rejection, the frequency is <math>\leq</math> [63] Hz;</li> <li>b. Within [3] seconds following load rejection, the voltage is <math>\geq</math> [3740] V and <math>\leq</math> [4580] V; and</li> <li>c. Within [3] seconds following load rejection, the frequency is <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</li> </ol> | <p style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;">Insert 1</p> <p>[18 months]</p> |
| <p>SR 3.8.1.10</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">NOTE <sup>Normally</sup></p> <p>This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> </div> <p>Verify each DG, operating at a power factor <math>\leq</math> [0.9], does not trip, and voltage is maintained <math>\leq</math> [5000] V during and following a load rejection of <math>\geq</math> [4500] kW and <math>\leq</math> [5000] kW.</p>   | <p style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;">Insert 1</p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.1.11</p> <p>-----NOTE-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period. <i>Normally</i></li> <li>2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. <i>←</i> However, credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p>-----</p> <p>Verify on an actual or simulated loss of offsite power signal:</p> <ol style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses;</li> <li>c. DG auto-starts from standby condition and:               <ol style="list-style-type: none"> <li>1. energizes permanently connected loads in <math>\leq</math> [10] seconds,</li> <li>2. energizes auto-connected shutdown loads through [automatic load sequencer],</li> <li>3. maintains steady state voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V,</li> <li>4. maintains steady state frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz, and</li> <li>5. supplies permanently connected [and auto-connected] shutdown loads for <math>\geq</math> 5 minutes.</li> </ol> </li> </ol> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.1.12</p> <p style="text-align: center;">-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period. <i>Normally</i></li> <li>2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p>-----</p> <p>Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal each DG auto-starts from standby condition and:</p> <ol style="list-style-type: none"> <li>a. In <math>\leq</math> [10] seconds after auto-start and during tests, achieves voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V;</li> <li>b. In <math>\leq</math> [10] seconds after auto-start and during tests, achieves frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz;</li> <li>c. Operates for <math>\geq</math> 5 minutes;</li> <li>d. Permanently connected loads remain energized from the offsite power system; and</li> <li>e. Emergency loads are energized [or auto-connected through the automatic load sequencer] from the offsite power system.</li> </ol> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.1.13</p> <p style="text-align: center;"><i>Normally</i></p> <p style="text-align: center;">NOTE</p> <p>This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>Verify each DG automatic trip is bypassed on [actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal] except:</p> <ul style="list-style-type: none"> <li>a. Engine overspeed; [and]</li> <li>b. Generator differential current[;</li> <li>c. Low lube oil pressure;</li> <li>d. High crankcase pressure; and</li> <li>e. Start failure relay].</li> </ul> | <p style="text-align: center;"><i>Insert 1</i></p> <p>[18 months]</p> |

(continued)



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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY                                 |
|--|---|
| <p>SR 3.8.1.14 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. Momentary transients outside the load and power factor ranges do not invalidate this test. <i>Normally</i></li> <li>2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p>-----</p> <p>Verify each DG, operating at a power factor <math>\leq</math> [0.9], operates for <math>\geq</math> 24 hours:</p> <ol style="list-style-type: none"> <li>a. For <math>\geq</math> [2] hours loaded <math>\geq</math> [5250] kW and <math>\leq</math> [5500] kW; and</li> <li>b. For the remaining hours of the test loaded <math>\geq</math> [4500] kW and <math>\leq</math> [5000] kW.</li> </ol> | <p><i>Insert 1</i></p> <p>[18 months]</p> |
| <p>SR 3.8.1.15 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated <math>\geq</math> [2] hours loaded <math>\geq</math> [4500] kW and <math>\leq</math> [5000] kW.</li> </ol> <p>Momentary transients outside of load range do not invalidate this test.</p> <ol style="list-style-type: none"> <li>2. All DG starts may be preceded by an engine prelube period.</li> </ol> <p>-----</p> <p>Verify each DG starts and achieves, in <math>\leq</math> [10] seconds, voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V, and frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p>                            | <p>[18 months]</p>                        |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.1.16</p> <p style="text-align: center;">-----NOTE----- <i>(Normally)</i></p> <p>This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify each DG:</p> <ul style="list-style-type: none"> <li>a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;</li> <li>b. Transfers loads to offsite power source; and</li> <li>c. Returns to ready-to-load operation.</li> </ul>                       | <p style="text-align: center;"><i>Insert 1</i></p> <p>[18 months]</p> |
| <p>SR 3.8.1.17</p> <p style="text-align: center;">-----NOTE----- <i>(Normally)</i></p> <p>This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify, with a DG operating in test mode and connected to its bus, an actual or simulated ESF actuation signal overrides the test mode by:</p> <ul style="list-style-type: none"> <li>a. Returning DG to ready-to-load operation [; and</li> <li>b. Automatically energizing the emergency load from offsite power].</li> </ul> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY                                 |
|--|---|
| <p>SR 3.8.1.18</p> <p><i>Normally</i></p> <p>NOTE<br/>This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>Verify interval between each sequenced load block is within <math>\pm</math> [10% of design interval] for each emergency [and shutdown] load sequencer.</p> | <p><i>Insert 1</i></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.8.1.19</p> <p style="text-align: center;">-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period. <i>Normally</i></li> <li>2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p>Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal:</p> <ol style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses;</li> <li>c. DG auto-starts from standby condition and:               <ol style="list-style-type: none"> <li>1. energizes permanently connected loads in <math>\leq</math> [10] seconds,</li> <li>2. energizes auto-connected emergency loads through [load sequencer],</li> <li>3. achieves steady state voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V,</li> <li>4. achieves steady state frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz, and</li> <li>5. supplies permanently connected [and auto-connected] emergency loads for <math>\geq</math> [5] minutes.</li> </ol> </li> </ol> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.4.6</p> <p style="text-align: center;">-----NOTE-----</p> <p style="text-align: center;"><i>Normally</i></p> <p>This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify each battery charger supplies <math>\geq</math> [400] amps at <math>\geq</math> [125/250] V for <math>\geq</math> [8] hours.</p>   | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |
| <p>SR 3.8.4.7</p> <p style="text-align: center;">-----NOTES-----</p> <p>1. The modified performance discharge test in SR 3.8.4.8 may be performed in lieu of the service test in SR 3.8.4.7 once per 60 months.</p> <p style="text-align: center;"><i>Normally</i></p> <p>2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.</p> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.4.8</p> <p>----- NOTE <sup>Normally</sup> -----<br/>           This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify battery capacity is <math>\geq</math> [80]% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.</p> | <p><u>Insert 2</u></p> <p>60 months</p> <p><u>AND</u></p> <p>12 months when battery shows degradation or has reached [85]% of the expected life with capacity &lt; 100% of manufacturer's rating</p> <p><u>AND</u></p> <p>24 months when battery has reached [85]% of the expected life with capacity <math>\geq</math> 100% of manufacturer's rating</p> |

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**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.1.6 (continued)

Frequency is appropriate. Since proper operation of fuel transfer systems is an inherent part of DG OPERABILITY, the Frequency of this SR should be modified to reflect individual designs.

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Transfer of each [4.16 kV ESF bus] power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads. The [18 month] Frequency of the Surveillance is based on engineering judgment, taking into consideration the unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Base Insert 1*

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage

(continued)

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BASES

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REQUIREMENTS

SR 3.8.1.9 (continued)

and frequency and while maintaining a specified margin to the overspeed trip. [For this unit, the single load for each DG and its horsepower rating is as follows:] This Surveillance may be accomplished by:

- a. Tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest post-accident load while paralleled to offsite power or while solely supplying the bus; or
- b. Tripping its associated single largest post-accident load with the DG solely supplying the bus.

As required by IEEE-308 (Ref. 13), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The [3] seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9).

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR. In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, Note 2 requires that, if synchronized to offsite power, testing must be performed using a power factor  $\leq$  [0.9]. This power factor is chosen to be representative

Bases Insert  
1

(continued)



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**BASES**

**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.1.10 (continued)

of the actual design basis inductive loading that the DG would experience.

The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9) and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbation to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Basics Insert 1*

**Reviewer's Note:** The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;
- b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and
- c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

SR 3.8.1.11

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(1), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the DG. It further demonstrates the capability of the DG to

(continued)

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REQUIREMENTS

SR 3.8.1.11 (continued)

*Bases Insert 2*

systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts and achieves the required voltage and frequency within the specified time ([10] seconds) from the design basis actuation signal (LOCA signal) and operates for  $\geq 5$  minutes. The 5 minute period provides sufficient time to demonstrate stability. SR 3.8.1.12.d and SR 3.8.1.12.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on an ESF signal without loss of offsite power.

The requirement to verify the connection of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, ECCS injection valves are not desired to be stroked open, high pressure injection systems are not capable of being operated at full flow, or SDC systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of [18 months] takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from

(continued)

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BASES

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REQUIREMENTS

SR 3.8.1.12 (continued)

standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.13

*Bases Insert 2*

This Surveillance demonstrates that DG noncritical protective functions (e.g., high jacket water temperature) are bypassed on a loss of voltage signal concurrent with an ESF actuation test signal, and critical protective functions (engine overspeed, generator differential current, [low lube oil pressure, high crankcase pressure, and start failure relay]) trip the DG to avert substantial damage to the DG unit. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

The [18 month] Frequency is based on engineering judgment, taking into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

The SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DG from service. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 1*

(continued)

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BASES

**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.1.14 (continued)

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 7), paragraph 2.a.(3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by two Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Base Insert 1*

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within [10] seconds. The [10] second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(5).

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least [2] hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

(continued)

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BASES

**SURVEILLANCE  
REQUIREMENTS**  
(continued)

SR 3.8.1.16

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and that the DG can be returned to ready to load status when offsite power is restored. It also ensures that the auto-start logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the output breaker is open and can receive and autoclose signal on bus undervoltage, and the load sequence timers are reset.

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 1*

SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing and the DG will automatically reset to ready to load operation if a LOCA actuation signal is received during operation in the test mode. Ready to load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2).

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirement associated with SR 3.8.1.17.b is to show that the emergency loading was not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the

(continued)

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SR 3.8.1.17 (continued)

emergency loads to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(8); takes into consideration unit conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.1.18

Under accident [and loss of offsite power] conditions loads are sequentially connected to the bus by the [automatic load sequencer]. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The [10]% load sequence time interval tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 1 provides a summary of the automatic loading of ESF buses.

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2); takes into consideration unit conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 1*

(continued)

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BASES

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**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.1.19 (continued)

standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations for DGs. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Base Insert 2*

SR 3.8.1.20

This Surveillance demonstrates that the DG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed within the specified time when the DGs are started simultaneously.

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9).

This SR is modified by a Note. The reason for the Note is to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated, and temperature maintained consistent with manufacturer recommendations.

Diesel Generator Test Schedule

The DG test schedule (Table 3.8.1-1) implements the recommendations of Revision 3 to Regulatory Guide 1.9 (Ref. 3). The purpose of this test schedule is to provide timely test data to establish a confidence level associated with the goal to maintain DG reliability above 0.95 per demand.

According to Regulatory Guide 1.9, Revision 3 (Ref. 3), each DG unit should be tested at least once every 31 days. Whenever a DG has experienced 4 or more valid failures in the last 25 valid tests, the maximum time between tests is reduced to 7 days. Four failures in 25 valid tests is a failure rate of 0.16, or the threshold of acceptable DG

(continued)

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BASES

**SURVEILLANCE  
REQUIREMENTS**  
(continued)

SR 3.8.4.6

This SR requires that each battery charger be capable of supplying [400] amps and [250/125] V for  $\geq$  [8] hours. These requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 10), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these [18 month] intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.4.7

A battery service test is a special test of battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 10) and Regulatory Guide 1.129 (Ref. 11), which state that the battery service test should be performed during refueling operations, or at some other outage, with intervals between tests not to exceed [18 months].

This SR is modified by two Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test once per 60 months.

(continued)



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BASES

**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.4.7 (continued)

The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

A modified discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test.

The reason for Note 2 is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Basas Insert 2*

SR 3.8.4.8

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the "as found" condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.7. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.8; however, only the modified performance discharge test may be used to satisfy

(continued)

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BASES

**SURVEILLANCE  
REQUIREMENTS**

**SR 3.8.4.8 (continued)**

SR 3.8.4.8 while satisfying the requirements of SR 3.8.4.7 at the same time.

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 9) and IEEE-485 (Ref. 5). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity  $\geq$  100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 (Ref. 9), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is  $\geq$  [10%] below the manufacturer's rating. These Frequencies are consistent with the recommendations in IEEE-450 (Ref. 9).

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Basics Insert 2*

**REFERENCES**

1. 10 CFR.50, Appendix A, GDC 17.
2. Regulatory Guide 1.6, March 10, 1971.
3. IEEE-308-[1978].
4. FSAR, Chapter [8].
5. IEEE-485-[1983], June 1983.

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY                           |
|--|-------------------------------------|
| <p>SR 3.8.1.7. -----NOTE-----<br/>All DG starts may be preceded by an engine prelube period.<br/>-----</p> <p>Verify each DG starts from standby condition and achieves, in <math>\leq</math> [12] seconds, voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V and frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p> | <p>184 days</p>                     |
| <p>SR 3.8.1.8 [-----NOTE-----<br/>This Surveillance shall <del>not</del> be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.<br/>-----]</p> <p>Verify [automatic [and] manual] transfer of [unit power supply] from the [normal offsite circuit to the alternate] offsite circuit.</p>                      | <p>[Insert!]</p> <p>[18 months]</p> |

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.8.1.9</p> <p style="text-align: center;">-----NOTES-----</p> <p style="text-align: center;"><i>Normally</i></p> <p>1. This Surveillance shall not be performed in MODE 1 or 2. <del>However,</del> credit may be taken for unplanned events that satisfy this SR.</p> <p>2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor <math>\leq</math> [0.9].</p> <p>-----</p> <p>Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and:</p> <p>a. Following load rejection, the frequency is <math>\leq</math> [65.5] Hz;</p> <p>b. Within [3] seconds following load rejection, the voltage is <math>\geq</math> [3740] V and <math>\leq</math> [4580] V; and</p> <p>c. Within [6] seconds following load rejection, the frequency is <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p> | <p style="text-align: center;"><i>Insert 1</i></p> <p>[18 months]</p> |
| <p>SR 3.8.1.10</p> <p style="text-align: center;">-----NOTE-----</p> <p style="text-align: center;"><i>Normally</i></p> <p>This Surveillance shall not be performed in MODE 1 or 2. <del>However,</del> credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify each DG operating at a power factor <math>\leq</math> [0.9] does not trip and voltage is maintained <math>\leq</math> [4800] V during and following a load rejection of <math>\geq</math> [1710] kW and <math>\leq</math> [2000] kW.</p>   | <p style="text-align: center;"><i>Insert 1</i></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY          |
|---|--------------------|
| <p>SR 3.8.1.11</p> <p style="text-align: center;">-----NOTES-----</p> <p>1. All DG starts may be preceded by an engine prelube period. <i>Normally</i></p> <p>2. This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR. <i>Insert 2</i></p> <p>-----</p> <p>Verify on an actual or simulated loss of offsite power signal:</p> <p>a. De-energization of emergency buses;</p> <p>b. Load shedding from emergency buses; and</p> <p>c. DG auto-starts from standby condition and:</p> <ol style="list-style-type: none"> <li>1. energizes permanently connected loads in <math>\leq</math> [12] seconds,</li> <li>2. energizes auto-connected shutdown loads through [automatic load sequencer],</li> <li>3. maintains steady state voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V,</li> <li>4. maintains steady state frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz, and</li> <li>5. supplies permanently connected and auto-connected shutdown loads for <math>\geq</math> [5] minutes.</li> </ol> | <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.8.1.12</p> <p style="text-align: center;">-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period <i>(Normally)</i></li> <li>2. This Surveillance shall not be performed in MODE 1 or 2 <del>however,</del> credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p style="text-align: center;">-----</p> <p>Verify on an actual or simulated Emergency Core Cooling System (ECCS) initiation signal each DG auto-starts from standby condition and:</p> <ol style="list-style-type: none"> <li>a. In <math>\leq</math> [12] seconds after auto-start and during tests, achieves voltage <math>\geq</math> [3740] V and <math>\leq</math> [4580] V;</li> <li>b. In <math>\leq</math> [12] seconds after auto-start and during tests, achieves frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz;</li> <li>c. Operates for <math>\geq</math> [5] minutes;</li> <li>d. Permanently connected loads remain energized from the offsite power system; and</li> <li>e. Emergency loads are energized [or auto-connected through the automatic load sequencer] from the offsite power system.</li> </ol> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.8.1.13</p> <div style="border: 1px dashed black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;">NOTE <sup>Normally</sup></p> <p>This Surveillance shall not be performed in MODE 1, 2 or 3. However, credit may be taken for unplanned events that satisfy this SR.</p> </div> <p>Verify each DG's automatic trips are bypassed on [actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ECCS initiation signal] except:</p> <ul style="list-style-type: none"> <li>a. Engine overspeed; [and]</li> <li>b. Generator differential current[;</li> <li>c. Low lube oil pressure;</li> <li>d. High crankcase pressure; and</li> <li>e. Start failure relay].</li> </ul> | <p style="text-align: center;">Insert 1</p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.8.1.14 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. Momentary transients outside the load and power factor ranges do not invalidate this test. <i>Normally</i></li> <li>2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p>-----</p> <p>Verify each DG operating at a power factor <math>\leq</math> [0.9] operates for <math>\geq</math> 24 hours:</p> <ol style="list-style-type: none"> <li>a. For <math>\geq</math> [2] hours loaded <math>\geq</math> [3100] kW and <math>\leq</math> [3400] kW; and</li> <li>b. For the remaining hours of the test loaded <math>\geq</math> [2850] kW and <math>\leq</math> [3150] kW.</li> </ol>   | <p style="text-align: center;"><i>Insert 1</i></p> <p>[18 months]</p> |
| <p>SR 3.8.1.15 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated <math>\geq</math> [2] hours loaded <math>\geq</math> [1710] kW and <math>\leq</math> [2000] kW.</li> </ol> <p style="padding-left: 40px;">Momentary transients outside of load range do not invalidate this test.</p> <ol style="list-style-type: none"> <li>2. All DG starts may be preceded by an engine prelube period.</li> </ol> <p>-----</p> <p>Verify each DG starts and achieves, in <math>\leq</math> [12] seconds, voltage <math>\geq</math> [3740] V and <math>\leq</math> [4584] V and frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p> | <p>[18 months]</p>  |

(continued)



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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.8.1.16</p> <p style="text-align: center;">-----NOTE----- <sup>(Normally)</sup></p> <p>This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify each DG:</p> <ul style="list-style-type: none"> <li>a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;</li> <li>b. Transfers loads to offsite power source; and</li> <li>c. Returns to ready-to-load operation.</li> </ul>                       | <p style="text-align: center;">(Insert 1)</p> <p>[18 months]</p> |
| <p>SR 3.8.1.17</p> <p style="text-align: center;">-----NOTE----- <sup>(Normally)</sup></p> <p>This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify with a DG operating in test mode and connected to its bus, an actual or simulated ECCS initiation signal overrides the test mode by:</p> <ul style="list-style-type: none"> <li>a. Returning DG to ready-to-load operation[; and]</li> <li>b. Automatically energizing the emergency load from offsite power.</li> </ul> | <p style="text-align: center;">(Insert 2)</p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.8.1.18</p> <p style="text-align: center;">-----NOTE----- <i>Normally</i></p> <p>This Surveillance shall not be performed in MODE 1, 2 or 3. However, credit may be taken for unplanned events that satisfy this SR.</p> <p style="text-align: center;">-----</p> <p>Verify interval between each sequenced load block is within ± [10% of design interval] [for each load sequencer timer].</p>  | <p style="text-align: center;"><i>Insert 1</i></p> <p>[18 months]</p>   |
| <p>SR 3.8.1.19</p> <p style="text-align: center;">-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period. <i>Normally</i></li> <li>2. This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p style="text-align: center;">-----</p> <p>Verify, on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ECCS initiation signal:</p> <ol style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses; and</li> <li>c. DG auto-starts from standby condition and:             <ol style="list-style-type: none"> <li>1. energizes permanently connected loads in ≤ [12] seconds,</li> <li>2. energizes auto-connected emergency loads through [load sequencer],</li> </ol> </li> </ol> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> <p style="text-align: right;">(continued)</p> |

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.8.4.6</p> <p style="text-align: center;">-----NOTE----- <sup>(normally)</sup></p> <p>This Surveillance shall not be performed in MODE 1, 2, or 3. <del>However, credit may be taken for unplanned events that satisfy this SR.</del></p> <p>-----</p> <p>Verify each required battery charger supplies <math>\geq</math> [400 amps for station service subsystems, and <math>\geq</math> 100 amps for DG subsystems] at <math>\geq</math> [129] V for <math>\geq</math> [4] hours.</p>   | <p style="text-align: center;">Insert 2</p> <p>[18 months]</p> |
| <p>SR 3.8.4.7</p> <p style="text-align: center;">-----NOTES-----</p> <p>1. The modified performance discharge test in SR 3.8.4.8 may be performed in lieu of the service test in SR 3.8.4.7 once per 60 months. <sup>(normally)</sup></p> <p>2. This Surveillance shall not be performed in MODE 1, 2, or 3. <del>However, credit may be taken for unplanned events that satisfy this SR.</del></p> <p>-----</p> <p>Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.</p> | <p style="text-align: center;">Insert 2</p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.8.4.8</p> <p>NOTE <sup>Normally</sup><br/>           This Surveillance shall not be performed in<br/>           MODE 1, 2, or 3. <del>However, credit may be</del><br/>           taken for unplanned events that satisfy<br/>           this SR.</p> <p>Verify battery capacity is <math>\geq</math> [80]% of the<br/>           manufacturer's rating when subjected to a<br/>           performance discharge test or a modified<br/>           performance discharge test.</p> | <p><u>Insert 2</u></p> <p>60 months</p> <p><u>AND</u></p> <p>12 months when<br/>           battery shows<br/>           degradation or<br/>           has reached<br/>           [85]% of<br/>           expected life<br/>           with capacity<br/>           &lt; 100% of<br/>           manufacturer's<br/>           rating</p> <p><u>AND</u></p> <p>24 months when<br/>           battery has<br/>           reached [85]%<br/>           of the expected<br/>           life with<br/>           capacity<br/> <math>\geq</math> 100% of<br/>           manufacturer's<br/>           rating</p> |

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SR 3.8.1.6 (continued)

part of DG OPERABILITY, the Frequency of this SR should be modified to reflect individual designs.

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Transfer of each 4.16 kV ESF bus power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads. The [18 month] Frequency of the Surveillance is based on engineering judgment taking into consideration the plant conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed on the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note. The reason for the Note is that, during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 1*

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. The largest single load for each DG is a residual heat removal service water pump (1225 bhp). This Surveillance may be accomplished by:

(continued)

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**SR 3.8.1.9 (continued)**

- a. Tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest post-accident load while paralleled to offsite power, or while solely supplying the bus; or
- b. Tripping its associated single largest post-accident load with the DG solely supplying the bus.

As required by IEEE-308 (Ref. 14), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower. For DGs 2A, 2C, and 1B, this represents 65.5 Hz, equivalent to 75% of the difference between nominal speed and the overspeed trip setpoint.

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The [6] seconds specified is equal to 60% of the 10 second load sequence interval associated with sequencing the residual heat removal (RHR) pumps during an undervoltage on the bus concurrent with a LOCA. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9).

*Basins Insert 1*

This SR is modified by two Notes. The reason for Note 1 is that, during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, Note 2 requires that, if synchronized to offsite power, testing must be performed using a power factor  $\leq$  [0.9]. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

(continued)

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**SURVEILLANCE  
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SR 3.8.1.10 (continued)

The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9) and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that would challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Basin Insert 1*

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;
- b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and
- c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

SR 3.8.1.11

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(1), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time.

The DG auto-start time of 12 seconds is derived from requirements of the accident analysis for responding to a

(continued)

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REQUIREMENTS**

SR 3.8.1.11 (continued)

design basis large break LOCA. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability has been achieved.

The requirement to verify the connection and power supply of permanent and auto-connected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, or systems are not capable of being operated at full flow, or RHR systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of the connection and loading of these loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(1), takes into consideration plant conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs shall be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

(continued)



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SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.12 (continued)

performance of this Surveillance could potentially cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Base Insert 2*

SR 3.8.1.13

This Surveillance demonstrates that DG non-critical protective functions (e.g., high jacket water temperature) are bypassed on an ECCS initiation test signal and critical protective functions (engine overspeed, generator differential current, and low lubricating oil pressure) trip the DG to avert substantial damage to the DG unit. The non-critical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

The [18 month] Frequency is based on engineering judgment, takes into consideration plant conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

The SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DG from service. Credit may be taken for unplanned events that satisfy this SR.

*Base Insert 1*

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;

(continued)

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REQUIREMENTS**

SR 3.8.1.13 (continued)

- b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and *Basess Insert 1*
- c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

SR 3.8.1.14

Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3), requires demonstration once per [18 months] that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours—22 hours of which is at a load equivalent to the continuous rating of the DG, and 2 hours of which is at a load equivalent to 110% of the continuous duty rating of the DG. Plant Hatch has taken an exception to this requirement and performs the 2 hour run at the 2000 hour rating (3100 kW). The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelube and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor  $\leq$  [0.9]. This power factor is chosen to be representative of the actual design basis inductive loading that the DG could experience. A load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3); takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

(continued)

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SR 3.8.1.14 (continued)

This Surveillance has been modified by two Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that would challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR.

Bases Insert A

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within [12] seconds. The [12] second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(5).

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The requirement that the diesel has operated for at least 2 hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. Momentary transients due to changing bus loads do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

SR 3.8.1.16

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and that the DG can be returned

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**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.1.16 (continued)

to ready-to-load status when offsite power is restored. It also ensures that the auto-start logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready-to-load status when the DG is at rated speed and voltage, the output breaker is open and can receive an auto-close signal on bus undervoltage, and the load sequence timers are reset.

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration plant conditions required to perform the Surveillance.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 1*

SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions is not compromised as the result of testing. Interlocks to the LOCA sensing circuits cause the DG to automatically reset to ready-to-load operation if an ECCS initiation signal is received during operation in the test mode. Ready-to-load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are required by IEEE-308 (Ref. 14), paragraph 6.2.6(2).

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirements associated with SR 3.8.1.17.b is to show that the emergency loading is not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

(continued)

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SR 3.8.1.17 (continued)

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(8); takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.1.18

Under accident conditions [and loss of offsite power] loads are sequentially connected to the bus by the automatic load sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The [10]% load sequence time interval tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses.

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2); takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 1*

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

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BASES

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SR 3.8.1.19 (continued)

Bases Insert 2

distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.20

This Surveillance demonstrates that the DG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed within the specified time when the DGs are started simultaneously.

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9).

This SR is modified by a Note. The reason for the Note is to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations.

Diesel Generator Test Schedule

The DG test schedule (Table 3.8.1-1) implements the recommendations of Revision 3 to Regulatory Guide 1.9 (Ref. 3). The purpose of this test schedule is to provide timely test data to establish a confidence level associated with the goal to maintain DG reliability at > 0.95 per test.

According to Regulatory Guide 1.9 (Ref. 3), Revision 3, each DG unit should be tested at least once every 31 days. Whenever a DG has experienced 4 or more valid failures in the last 25 valid tests, the maximum time between tests is reduced to 7 days. Four failures in 25 valid tests is a failure rate of 0.16, or the threshold of acceptable DG performance, and hence may be an early indication of the degradation of DG reliability. When considered in the light of a long history of tests, however, 4 failures in the last 25 valid tests may only be a statistically probable distribution of random events. Increasing the test Frequency allows a more timely accumulation of additional test data upon which to base judgment of the reliability of the DG. The

(continued)

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**SURVEILLANCE  
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SR 3.8.4.4 and SR 3.8.4.5 (continued)

The connection resistance limits for this SR must be no more than 20% above the resistance as measured during installation, or not above the ceiling value established by the manufacturer.

The 12 month Frequency of these SRs is consistent with IEEE-450 (Ref. 7), which recommends detailed visual inspection of cell condition and inspection of cell to cell and terminal connection resistance on a yearly basis.

SR 3.8.4.6

Battery charger capability requirements are based on the design capacity of the chargers (Ref. 3). According to Regulatory Guide 1.32 (Ref. 8), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

The Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these [18 month] intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. The reason for Note 1 is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Note 2 is added to this SR to acknowledge that credit may be taken for unplanned events that satisfy the Surveillance.

*Bases Insert 2*

(continued)

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SR 3.8.4.7 (continued)

*Bases Insert 2*

challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance.

SR 3.8.4.8

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.7. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.8; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.8 while satisfying the requirements of SR 3.8.4.7 at the same time.

The acceptance criteria for this Surveillance is consistent with IEEE-450 (Ref. 7) and IEEE-485 (Ref. 10). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity  $\geq$  100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 (Ref. 7), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is 10% below the manufacturer's rating. All these Frequencies are consistent with the recommendations in IEEE-450 (Ref. 7).

(continued)



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BASES

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**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.4.8 (continued)

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance.

*Basics Insert 2*

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REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
  2. Regulatory Guide 1.6.
  3. IEEE Standard 308, 1978.
  4. FSAR, Chapter [6].
  5. FSAR, Chapter [15].
  6. Regulatory Guide 1.93.
  7. IEEE Standard 450.
  8. Regulatory Guide 1.32, February 1977.
  9. Regulatory Guide 1.129, December 1974.
  10. IEEE Standard 485, 1983.
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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.8.1.7</p> <p>-----NOTE-----<br/>All DG starts may be preceded by an engine prelube period.</p> <p>-----</p> <p>Verify each DG starts from standby condition and achieves, in <math>\leq</math> [10] seconds, voltage <math>\geq</math> [3744] V and <math>\leq</math> [4576] V and frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p>  | <p>184 days</p>  |
| <p>SR 3.8.1.8</p> <p>-----NOTE-----<br/>This Surveillance shall not be performed in MODE 1 or 2. <del>However, credit may be taken for unplanned events that satisfy this SR.</del></p> <p>-----</p> <p>Verify [automatic and manual] transfer of [unit power supply] from the [normal] offsite circuit to each [required] alternate offsite circuit and between the [required] alternate] offsite circuits.</p> | <p><i>Normally</i></p> <p><i>Insert 1</i></p> <p>[18 months]</p> |

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.8.1.9</p> <p style="text-align: center;">NOTES</p> <p>1. This Surveillance shall not be performed in MODE 1 or 2. <sup>Normally</sup> However, credit may be taken for unplanned events that satisfy this SR.</p> <p>2. If performed with DG synchronized with offsite power, it shall be performed at a power factor <math>\leq</math> [0.9].</p> <p>Verify each DG rejects a load greater than or equal to its associated single largest post-accident load for [Division 1 and <math>\geq</math> [550] kW for Division 2] DGs and <math>\geq</math> [2180] kW for [Division 3] DG, and:</p> <p>a. Following load rejection, the frequency is <math>\leq</math> [69] Hz;</p> <p>b. Within [3] seconds following load rejection, the voltage is <math>\geq</math> [3744] V and <math>\leq</math> [4576] V; and</p> <p>c. Within [3] seconds following load rejection, the frequency is <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p> | <p style="text-align: center;">Insert 1</p> <p>[18 months]</p> |

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.1.10</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">-----NOTE----- <sup>Normally</sup></p> <p>This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR.</p> <p style="text-align: center;">-----</p> </div> <p>Verify each DG operating at a power factor <math>\leq</math> [0.9] does not trip and voltage is maintained <math>\leq</math> [5000] V during and following a load rejection of a load <math>\geq</math> [5450] kW and <math>\leq</math> [5740] kW for [Division 1 and 2] DGs and <math>\geq</math> [3300] kW and <math>\leq</math> [3500] kW for [Division 3] DG.</p> | <p style="text-align: center; font-size: 2em;">Insert!</p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY          |
|--|--------------------|
| <p>SR 3.8.1.11</p> <p style="text-align: center;">-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period. <i>Normally</i></li> <li>2. This Surveillance shall not be performed in MODE 1, 2, or 3. <i>Insert 2</i><br/>However, credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p>-----</p> <p>Verify on an actual or simulated loss of offsite power signal:</p> <ol style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses; and</li> <li>c. DG auto-starts from standby condition and:               <ol style="list-style-type: none"> <li>1. energizes permanently connected loads in <math>\leq [10]</math> seconds,</li> <li>2. energizes auto-connected shutdown loads through [automatic load sequencer],</li> <li>3. maintains steady state voltage <math>\geq [3744]</math> V and <math>\leq [4576]</math> V,</li> <li>4. maintains steady state frequency <math>\geq [58.8]</math> Hz and <math>\leq [61.2]</math> Hz, and</li> <li>5. supplies permanently connected and auto-connected shutdown loads for <math>\geq [5]</math> minutes.</li> </ol> </li> </ol> | <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY                                   |
|---|---|
| <p>SR 3.8.1.12</p> <p>-----NOTES-----</p> <p>1. All DG starts may be preceded by an engine prelube period. <i>(Normally)</i></p> <p>2. This Surveillance shall not be performed in MODE 1 or 2. <i>(However, credit may be taken for unplanned events that satisfy this SR.)</i></p> <p>-----</p> <p>Verify on an actual or simulated Emergency Core Cooling System (ECCS) initiation signal each DG auto-starts from standby condition and:</p> <p>a. In <math>\leq</math> [10] seconds after auto-start and during tests, achieves voltage <math>\geq</math> [3744] V and <math>\leq</math> [4576] V;</p> <p>b. In <math>\leq</math> [10] seconds after auto-start and during tests, achieves frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz;</p> <p>c. Operates for <math>\geq</math> [5] minutes;</p> <p>d. Permanently connected loads remain energized from the offsite power system; and</p> <p>e. Emergency loads are energized [or auto-connected through the automatic load sequencer] to from the offsite power system.</p> | <p><i>(Insert 2)</i></p> <p>[18 months]</p> |

(continued)

**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.8.1.13</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;">NOTE <sup>Normally</sup></p> <p>This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR.</p> </div> <p>Verify each DG's automatic trips are bypassed on [actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ECCS initiation signal] except:</p> <ol style="list-style-type: none"> <li>a. Engine overspeed; [and]</li> <li>b. Generator differential current[;</li> <li>c. Low lube oil pressure;</li> <li>d. High crankcase pressure; and</li> <li>e. Start failure relay].</li> </ol> | <p style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;">Insert 1</p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.8.1.14</p> <p style="text-align: center;">-----NOTES-----</p> <p>1. Momentary transients outside the load and power factor ranges do not invalidate this test.</p> <p>2. This Surveillance shall <sup>normally</sup> not be performed in MODE 1 or 2. <del>However,</del> credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify each DG operating at a power factor <math>\leq</math> [0.9] for Division 1 and 2 DGs, and <math>\leq</math> [0.9] for Division 3 DG, operates for <math>\geq</math> 24 hours:</p> <p>a. For <math>\geq</math> [2] hours loaded, <math>\geq</math> [5450] kW and <math>\leq</math> [5740] kW for Division 1 and 2 DGs, <math>\geq</math> [3630] kW and <math>\leq</math> [3830] kW for Division 3 DG; and</p> <p>b. For the remaining hours of the test loaded <math>\geq</math> [3744] kW and <math>\leq</math> [4576] kW for Division 1 and 2 DGs, and <math>\geq</math> [3300] kW and <math>\leq</math> [3500] kW for Division 3 DG.</p> | <p style="text-align: center;">Insert 1</p> <p>[18 months]</p> |

(continued)



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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY                                 |
|--|---|
| <p>SR 3.8.1.15 -----NOTES-----</p> <p>1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated <math>\geq</math> [2] hours loaded <math>\geq</math> [4500] kW and <math>\leq</math> [5000] kW for [Division 1 and 2] DGs, and <math>\geq</math> [3300] kW and <math>\leq</math> [3500] kW for Division 3 DG.</p> <p>Momentary transients outside of load range do not invalidate this test.</p> <p>2. All DG starts may be preceded by an engine prelube period.</p> <p>-----</p> <p>Verify each DG starts and achieves, in <math>\leq</math> [10] seconds, voltage <math>\geq</math> [3744] V and <math>\leq</math> [4576] V and frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz.</p> | <p>[18 months]</p>                        |
| <p>SR 3.8.1.16 -----NOTE-----</p> <p>This Surveillance shall <sup>normally</sup> not be performed in MODE 1, 2, or 3. <del>However, credit may be taken for unplanned events that satisfy this SR.</del></p> <p>-----</p> <p>Verify each DG:</p> <p>a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;</p> <p>b. Transfers loads to offsite power source; and</p> <p>c. Returns to ready-to-load operation.</p>  | <p><u>Insert 1</u></p> <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.8.1.17</p> <p style="text-align: center;">-----NOTE-----<br/><i>Normally</i></p> <p>This Surveillance shall not be performed in MODE 1, 2, or 3. <del>However, credit may be taken for unplanned events that satisfy this SR.</del></p> <p>Verify, with a DG operating in test mode and connected to its bus, an actual or simulated ECCS initiation signal overrides the test mode by:</p> <ul style="list-style-type: none"> <li>a. Returning DG to ready-to-load operation[; and]</li> <li>b. Automatically energizing the emergency load from offsite power.</li> </ul> | <p style="text-align: center;"><i>Insert 2</i></p> <p>[18 months]</p> |
| <p>SR 3.8.1.18</p> <p style="text-align: center;">-----NOTE-----<br/><i>Normally</i></p> <p>This Surveillance shall not be performed in MODE 1, 2, or 3. <del>However, credit may be taken for unplanned events that satisfy this SR.</del></p> <p>Verify interval between each sequenced load block is within <math>\pm</math> [10% of design interval] [for each load sequencer timer].</p>   | <p style="text-align: center;"><i>Insert 1</i></p> <p>[18 months]</p> |

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY          |
|--|--------------------|
| <p>SR 3.8.1.19</p> <p style="text-align: center;">-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period. <i>(Normally)</i></li> <li>2. This Surveillance shall not be performed in MODE 1, 2, or 3. <i>(Insert 2)</i><br/>However, credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p>-----</p> <p>Verify, on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated CCS initiation signal:</p> <ol style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses; and</li> <li>c. DG auto-starts from standby condition and:               <ol style="list-style-type: none"> <li>1. energizes permanently connected loads in <math>\leq</math> [10] seconds,</li> <li>2. energizes auto-connected emergency loads through [load sequencer],</li> <li>3. achieves steady state voltage <math>\geq</math> [3744] V and <math>\leq</math> [4576] V,</li> <li>4. achieves steady state frequency <math>\geq</math> [58.8] Hz and <math>\leq</math> [61.2] Hz, and</li> <li>5. supplies permanently connected and auto-connected emergency loads for <math>\geq</math> [5] minutes.</li> </ol> </li> </ol> | <p>[18 months]</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.8.4.6</p> <p>-----NOTE-----<br/>           This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR.</p> <p>-----</p> <p>Verify each [required] battery charger supplies <math>\geq</math> [400] amps at <math>\geq</math> [250/125] V for <math>\geq</math> [8] hours.</p>   | <p style="text-align: center;">Insert 2</p> <p>[18 months]</p> |
| <p>SR 3.8.4.7</p> <p>-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. The modified performance discharge test in SR 3.8.4.8 may be performed in lieu of the service test in SR 3.8.4.7 once per 60 months.</li> <li>2. This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR.</li> </ol> <p>-----</p> <p>Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.</p> | <p style="text-align: center;">Insert 2</p> <p>[18 months]</p> |

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.8.4.8</p> <p>-----NOTE-----<br/>           This Surveillance shall not be performed in<br/>           MODE 1, 2, or 3. However, credit may be<br/>           taken for unplanned events that satisfy<br/>           this SR.<br/>           -----</p> <p>Verify battery capacity is <math>\geq</math> [80]% of the<br/>           manufacturer's rating when subjected to a<br/>           performance discharge test or a modified<br/>           performance discharge test.</p> | <p style="text-align: center;">Insert 2</p> <p>60 months</p> <p><u>AND</u></p> <p>12 months when<br/>           battery shows<br/>           degradation or<br/>           has reached<br/>           [85]% of<br/>           expected life<br/>           with capacity<br/>           &lt; 100% of<br/>           manufacturer's<br/>           rating</p> <p><u>AND</u></p> <p>24 months when<br/>           battery has<br/>           reached [85]%<br/>           of the expected<br/>           life with<br/>           capacity<br/> <math>\geq</math> 100% of<br/>           manufacturer's<br/>           rating</p> |

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BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.8 (continued)

*Bases Insert 1*

safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. The load referenced for DG 11 is the 1200 kW low pressure core spray pump; for DG 12, the 550 kW residual heat removal (RHR) pump; and for DG 13 the 2180 kW HPCS pump. The Standby Service Water (SSW) pump values are not used as the largest load since the SSW supplies cooling to the associated DG. If this load were to trip, it would result in the loss of the DG. This Surveillance may be accomplished by:

- a. Tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest post-accident load while paralleled to offsite power, or while solely supplying the bus; or
- b. Tripping its associated single largest post-accident load with the DG solely supplying the bus.

As required by IEEE-308 (Ref. 13), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower. For the Grand Gulf Nuclear Station these values are the same.

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The 3 seconds specified is equal to 60% of the 5 second load

(continued)

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**SR 3.8.1.9 (continued)**

sequence interval associated with sequencing of this largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9).

This SR has been modified by two Notes. The reason for Note 1 is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, Note 2 requires that, if synchronized to offsite power, testing must be performed using a power factor  $\leq$  [0.9]. This power factor is chosen to be representative of the actual design basis inductive loading that the DG could experience.

Basics  
Insert 1

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;
- b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and
- c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

(continued)

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**SURVEILLANCE  
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(continued)

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. The DG full load rejection may occur because of a system fault or inadvertent breaker tripping. This Surveillance ensures proper engine generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG does not trip upon loss of the load. These acceptance criteria provide DG damage protection. While the DG is not expected to experience this transient during an event, and continues to be available, this response ensures that the DG is not degraded for future application, including reconnection to the bus if the trip initiator can be corrected or isolated.

In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing must be performed using a power factor  $\leq$  [0.9]. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9) and is intended to be consistent with expected fuel cycle lengths.

This SR has been modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbation to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR.

Basics  
Insert 1

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;

(continued)



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SR 3.8.1.11 (continued)

these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(1), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations for [Division 1 and 2] DGs. [For the [Division 3] DG, standby conditions mean that the lube oil is heated and continuously circulated through a portion of the system as recommended by the vendor. Engine jacket water is heated by the lubricating oil and circulates through the system by natural circulation.] The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge plant safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 2*

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts and achieves the required voltage and frequency within the specified time ([10] seconds) from the design basis actuation signal (LOCA signal) and operates for  $\geq$  [5] minutes. The [5] minute period provides sufficient time to demonstrate stability. SR 3.8.1.12.d and SR 3.8.1.12.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on an ECCS signal without loss of offsite power.

The requirement to verify the connection and power supply of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the

(continued)

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SR 3.8.1.12 (continued)

loading logic for loading onto offsite power. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, ECCS injection valves are not desired to be stroked open, high pressure injection systems are not capable of being operated at full flow, or RHR systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of the connection and loading of these loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of [18 months] takes into consideration plant conditions required to perform the Surveillance and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by two Notes. The reason for the Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Basin Inset 2*

SR 3.8.1.13

This Surveillance demonstrates that DG non-critical protective functions (e.g., high jacket water temperature) are bypassed on a loss of voltage signal concurrent with an ECCS initiation test signal and critical protective functions (engine overspeed, generator differential current,

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**SR 3.8.1.13 (continued)**

and low lube oil pressure) trip the DG to avert substantial damage to the DG unit. The non-critical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

The [18 month] Frequency is based on engineering judgment, taking into consideration plant conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

The SR is modified by a Note. The reason for the Note is that performing the Surveillance removes a required DG from service. Credit may be taken for unplanned events that satisfy this SR.

*Bases Insert 1*

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;
- b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and
- c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

(continued)

TSTF-283, Rev. 3

BASES

**SURVEILLANCE  
REQUIREMENTS  
(continued)**

SR 3.8.1.14

Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3), requires demonstration once per 18 months that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours—22 hours of which is at a load equivalent to the continuous rating of the DG, and 2 hours of which is at a load equivalent to 110% of the continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelube and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor  $\leq [0.9]$ . This power factor is chosen to be representative of the actual design basis inductive loading that the DG could experience.

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3); takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by two Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. Similarly, momentary power factor transients above the limit do not invalidate the test. The reason for Note 2 is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that would challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Basics Insert 1*

(continued)

TSTF-283, Rev. 3

BASES

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**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.1.16 (continued)

paragraph 2.1.(6); and takes into consideration plant conditions required to perform the Surveillance.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

Base Insert 1

SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions is not compromised as the result of testing. Interlocks to the LOCA sensing circuits cause the DG to automatically reset to ready-to-load operation if an ECCS initiation signal is received during operation in the test mode. Ready-to-load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2).

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirement associated with SR 3.8.1.17.b is to show that the emergency loading is not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(8); takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This SR has been modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the

(continued)

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BASES

**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.1.17 (continued)

electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Base Insert 2*

SR 3.8.1.18

Under accident conditions [and loss of offsite power] loads are sequentially connected to the bus by the load sequencing panel. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The [10]% load sequence time interval tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses.

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2); takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance during these MODES would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge plant safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Base Insert 1*

Reviewer's Note: The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

- a. Performance of the SR will not render any safety system or component inoperable;

(continued)

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BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.18 (continued)

- b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems; and
- c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

SR 3.8.1.19

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.11, during a loss of offsite power actuation test signal in conjunction with an ECCS initiation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of [18 months] takes into consideration plant conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of [18 months].

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge plant safety systems. Credit may be taken for unplanned events that satisfy this SR.

*Base Insert 2*

(continued)

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BASES

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**SURVEILLANCE  
REQUIREMENTS**  
(continued)

SR 3.8.4.6

Battery charger capability requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 9), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensure that these requirements can be satisfied.

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these 18 month intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance.

*Base Inset 2*

SR 3.8.4.7

A battery service test is a special test of the battery's capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length correspond to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 9) and Regulatory Guide 1.129 (Ref. 10), which state that the battery service test should be performed during refueling operations or at some other outage, with intervals between tests not to exceed 18 months.

This SR is modified by two Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test once per 60 months.

(continued)



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BASES

**SURVEILLANCE  
REQUIREMENTS**

SR 3.8.4.7 (continued)

The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

A modified discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test.

The reason for Note 2 is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance.

*Bases Insert 2*

SR 3.8.4.8

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.7. Either the battery performance discharge test or the modified performance discharge test is

(continued)

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BASES

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**SURVEILLANCE  
REQUIREMENTS**

**SR 3.8.4.8 (continued)**

acceptable for satisfying SR 3.8.4.8; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.8 while satisfying the requirements of SR 3.8.4.7 at the same time.

The acceptance criteria for this Surveillance is consistent with IEEE-450 (Ref. 8) and IEEE-485 (Ref. 11). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity  $\geq$  100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 (Ref. 8), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is  $\geq$  10% below the manufacturer's rating. All these Frequencies are consistent with the recommendations in IEEE-450 (Ref. 8).

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance.

*Bases  
Insert 2*

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REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. Regulatory Guide 1.6, March 10, 1971.
3. IEEE Standard 308, 1978.
4. FSAR, Section [8.3.2].

(continued)

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## Industry/TSTF Standard Technical Specification Change Traveler

Add "Met vs. Perform" to Specification 1.4, Frequency

Classification: 2) Consistency/Standardization

NUREGs Affected:  1430  1431  1432  1433  1434

**Description:**

Insert into Specification 1.4 a discussion paragraph and new example to facilitate the use and application of SR Notes that utilize "met" and "perform". Revise SRs as necessary to appropriately use "met" and "perform" exceptions.

**Justification:**

NUREG-1433 and 1434 contain a discussion in Specification 1.4 regarding the use of "met" and "performed" in SR Notes. Similarly, the Writer's Guide provides a distinction between these phrases. NUREG-1430, -1431, and -1432 do not contain this detail; however, various locations throughout these NUREGs provide Notes with "met" and "performed" distinctions. Inserting this material will provide for better use, application, and understanding of these Notes. Furthermore, this change will establish consistency between the NUREGs. With this clarification, several exceptions that are unclear or have incorrect usage of "met" and "perform" are also corrected.

Examples of Surveillance Notes are added. The examples parallel the existing example 1.4-3 of Notes that allow for the SR to "Not required to be performed . . .". The examples will alleviate misunderstanding and provide explicit direction for these types of SR Notes.

|                   |                  |                |                         |
|-------------------|------------------|----------------|-------------------------|
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| NRC Contact:      | Harbuck, Craig   | 301-415-3140   | cch@nrc.gov             |

### Revision History

**OG Revision 0**

**Revision Status: Closed**

Revision Proposed by: WOG

Revision Description:  
Original Issue

#### Owners Group Review Information

Date Originated by OG: 19-Aug-97

Owners Group Comments  
(No Comments)

Owners Group Resolution: Approved Date: 19-Aug-97

#### TSTF Review Information

TSTF Received Date: 20-Nov-97 Date Distributed for Review 06-Jan-98

OG Review Completed:  BWOG  WOG  CEOG  BWROG

**TSTF Comments:**

2/5/98 - Applicable to all PWRs. Excel to markup the CEOG and BWOG NUREGs and provide to the CEOG and BWOG chairmen prior to sending to NRC.

7/98 - Comments received from CEOG and BWOG chairmen. Traveler to be revised.

1/11/00

**OG Revision 0****Revision Status: Closed**

Redistributed to TSTF on 5/27/98

- 7/10/98 - Change "performed" to "met" and change/add appropriate Bases change on BWOOG p 3.4-26
- Withdraw WOG SR 3.3.1.4 on Pg 3.3-11 from TSTF-284.
- Change SR 3.3.8.3 and SR 3.3.8.4 to "Only"

TSTF Resolution: Approved Date: 10-Jul-98

**NRC Review Information**

NRC Received Date: 25-Sep-98

NRC Comments:

11/12/98 - The TSTF wants to pursue the change and come back to the NRC with a broader scope change of Met versus Performed. TSTF to inform the NRC of status of revisiting of Met vs. Performed in January, 1999.

Final Resolution: Superseded by Revision

Final Resolution Date: 03-Feb-99

**TSTF Revision 1****Revision Status: Closed**

Revision Proposed by: WOG

Revision Description:

Deleted changes to NUREG-1431 (Westinghouse), SR 3.7.5.3 and 3.7.5.4.

**TSTF Review Information**

TSTF Received Date: 03-Feb-99 Date Distributed for Review

OG Review Completed:  BWOOG  WOG  CEOG  BWROG

TSTF Comments:

On hold.

05/23/99 This change is superseded to incorporate TSTF-270 R1.

TSTF Resolution: Superseded Date:

**TSTF Revision 2****Revision Status: Closed**

Revision Proposed by: TSTF

Revision Description:

This change incorporates proposed TSTF-270 R1 and TSTF-288, consistent with proper use of "met" and "perform" notes. Also, examples of Surveillance Notes that allow for the SR to "Only required to be performed . . .", "Only required to be met . . .", and "not required to be met . . ." are added.

**TSTF Review Information**

TSTF Received Date: 28-May-99 Date Distributed for Review 15-Jun-99

OG Review Completed:  BWOOG  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

1/11/00

**TSTF Revision 2****Revision Status: Closed**

TSTF Resolution: Approved Date: 15-Jun-99

**NRC Review Information**

NRC Received Date: 23-Jun-99

NRC Comments:

12/14/99 - Denny B to revise and send to TSTF for review.

1/10/00 - TSTF agrees to make changes.

Final Resolution: Superseded by Revision

Final Resolution Date:

**TSTF Revision 3****Revision Status: Active****Next Action: NRC**

Revision Proposed by: NRC

Revision Description:

The "Description" section of Section 1.4 is revised to incorporate NRC comments and to make the section consistent between all 5 ISTS NUREGs. Notes are added to SR 3.9.3.2 (WOG and CEOG) and 3.9.4.2 (WOG) to properly address met vs. performed issues. The changes to these two SRs were originally proposed in TSTF-92. The NRC requested that the change be incorporated into TSTF-284.

**TSTF Review Information**

TSTF Received Date: 10-Jan-00 Date Distributed for Review 10-Jan-00

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 10-Jan-00

**NRC Review Information**

NRC Received Date: 11-Jan-00

NRC Comments:

(No Comments)

Final Resolution: NRC Action Pending

Final Resolution Date:

**Incorporation Into the NUREGs**

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

**Affected Technical Specifications**

| 1.4        | Frequency                |                          |
|------------|--------------------------|--------------------------|
| SR 3.9.3.2 | Containment Penetrations | NUREG(s)- 1430 1432 Only |

1/11/00

|                     |                          |                          |
|---------------------|--------------------------|--------------------------|
| SR 3.9.4.2 Bases    | Containment Penetrations | NUREG(s)- 1430 1432 Only |
| SR 3.1.3.2          | MTC                      | NUREG(s)- 1430 Only      |
| SR 3.1.3.2 Bases    | MTC                      | NUREG(s)- 1430 Only      |
| SR 3.4.12.6         | LTOP System              | NUREG(s)- 1430 Only      |
| SR 3.4.12.6 Bases   | LTOP System              | NUREG(s)- 1430 Only      |
| SR 3.7.5.3          | EFW System               | NUREG(s)- 1430 Only      |
| SR 3.7.5.3 Bases    | EFW System               | NUREG(s)- 1430 Only      |
| SR 3.7.5.4          | EFW System               | NUREG(s)- 1430 Only      |
| SR 3.7.5.4 Bases    | EFW System               | NUREG(s)- 1430 Only      |
| SR 3.1.11.1         | SDM Test Exceptions      | NUREG(s)- 1431 Only      |
| SR 3.1.11.2         | SDM Test Exceptions      | NUREG(s)- 1431 Only      |
| SR 3.1.11.2 Bases   | SDM Test Exceptions      | NUREG(s)- 1431 Only      |
| Action 3.4.11 Bases | Pressurizer PORVs        | NUREG(s)- 1431 Only      |
| Ref. 3.4.11 Bases   | Pressurizer PORVs        | NUREG(s)- 1431 Only      |
| SR 3.4.11.1         | Pressurizer PORVs        | NUREG(s)- 1431 Only      |
| SR 3.4.11.1 Bases   | Pressurizer PORVs        | NUREG(s)- 1431 Only      |
| SR 3.4.11.2         | Pressurizer PORVs        | NUREG(s)- 1431 Only      |
| SR 3.4.11.2 Bases   | Pressurizer PORVs        | NUREG(s)- 1431 Only      |
| SR 3.9.3.2 Bases    | Containment Penetrations | NUREG(s)- 1431 Only      |
| SR 3.9.4.2          | Containment Penetrations | NUREG(s)- 1431 Only      |
| SR 3.1.4.1          | MTC (Analog)             | NUREG(s)- 1432 Only      |
| SR 3.1.4.1          | MTC (Digital)            | NUREG(s)- 1432 Only      |
| SR 3.1.4.1 Bases    | MTC (Analog)             | NUREG(s)- 1432 Only      |
| SR 3.1.4.1 Bases    | MTC (Digital)            | NUREG(s)- 1432 Only      |
| SR 3.1.4.2          | MTC (Analog)             | NUREG(s)- 1432 Only      |
| SR 3.1.4.2          | MTC (Digital)            | NUREG(s)- 1432 Only      |
| SR 3.1.4.2 Bases    | MTC (Analog)             | NUREG(s)- 1432 Only      |

1/11/00

|                   |   |                     |
|-------------------|---|---------------------|
| SR 3.1.4.2 Bases  | MTC (Digital)                             | NUREG(s)- 1432 Only |
| SR 3.1.7.1        | Regulating CEA Insertion Limits (Analog)  | NUREG(s)- 1432 Only |
| SR 3.1.7.1        | Regulating CEA Insertion Limits (Digital) | NUREG(s)- 1432 Only |
| SR 3.1.7.1 Bases  | Regulating CEA Insertion Limits (Analog)  | NUREG(s)- 1432 Only |
| SR 3.1.7.1 Bases  | Regulating CEA Insertion Limits (Digital) | NUREG(s)- 1432 Only |
| SR 3.2.1.1        | LHR (Analog)                              | NUREG(s)- 1432 Only |
| SR 3.2.1.1        | LHR (Digital)                             | NUREG(s)- 1432 Only |
| SR 3.2.1.1 Bases  | LHR (Analog)                              | NUREG(s)- 1432 Only |
| SR 3.2.1.1 Bases  | LHR (Digital)                             | NUREG(s)- 1432 Only |
| SR 3.2.1.2        | LHR (Analog)                              | NUREG(s)- 1432 Only |
| SR 3.2.1.2 Bases  | LHR (Analog)                              | NUREG(s)- 1432 Only |
| SR 3.2.1.3        | LHR (Analog)                              | NUREG(s)- 1432 Only |
| SR 3.2.3.1        | Tq (Digital)                              | NUREG(s)- 1432 Only |
| SR 3.2.4.1        | DNBR (Digital)                            | NUREG(s)- 1432 Only |
| SR 3.2.4.1 Bases  | DNBR (Digital)                            | NUREG(s)- 1432 Only |
| SR 3.2.4.2        | DNBR (Digital)                            | NUREG(s)- 1432 Only |
| SR 3.3.8.3        | CPIS (Digital)                            | NUREG(s)- 1432 Only |
| SR 3.3.8.3 Bases  | CPIS (Digital)                            | NUREG(s)- 1432 Only |
| SR 3.3.8.4        | CPIS (Digital)                            | NUREG(s)- 1432 Only |
| SR 3.3.8.4 Bases  | CPIS (Digital)                            | NUREG(s)- 1432 Only |
| Ref. 3.4.11 Bases | Pressurizer PORVs                         | NUREG(s)- 1432 Only |
| SR 3.4.11.1       | Pressurizer PORVs                         | NUREG(s)- 1432 Only |
| SR 3.4.11.1 Bases | Pressurizer PORVs                         | NUREG(s)- 1432 Only |
| SR 3.4.11.2       | Pressurizer PORVs                         | NUREG(s)- 1432 Only |
| SR 3.4.11.2 Bases | Pressurizer PORVs                         | NUREG(s)- 1432 Only |
| SR 3.7.5.3        | AFW System                                | NUREG(s)- 1432 Only |
| SR 3.7.5.3        | AFW System                                | NUREG(s)- 1432 Only |

1/11/00

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|            |            |                     |
|------------|------------|---------------------|
| SR 3.7.5.4 | AFW System | NUREG(s)- 1432 Only |
|------------|------------|---------------------|

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|                  |            |                     |
|------------------|------------|---------------------|
| SR 3.7.5.4 Bases | AFW System | NUREG(s)- 1432 Only |
|------------------|------------|---------------------|

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INSERT 1 (PWR)

Sometimes special situations dictate when the requirements of a Surveillance are to be met. They are "otherwise stated" conditions allowed by SR 3.0.1. They may be stated as clarifying Notes in the Surveillance, as part of the Surveillance, or both.

Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated LCO is within its Applicability, represent potential SR 3.0.4 conflicts. To avoid these conflicts, the SR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With an SR satisfied, SR 3.0.4 imposes no restriction.

The use of "met" or "performed" in these instances conveys specific meanings. A Surveillance is "met" only when the acceptance criteria are satisfied. Known failure of the requirements of a Surveillance, even without a Surveillance specifically being "performed," constitutes a Surveillance not "met." "Performance" refers only to the requirement to specifically determine the ability to meet the acceptance criteria.

Some Surveillances contain notes that modify the Frequency of performance or the conditions during which the acceptance criteria must be satisfied. For these Surveillances, the MODE-entry restrictions of SR 3.0.4 may not apply. Such a Surveillance is not required to be performed prior to entering a MODE or other specified condition in the Applicability of the associated LCO if any of the following three conditions are satisfied:

- a. The Surveillance is not required to be met in the MODE or other specified condition to be entered; or
- b. The Surveillance is required to be met in the MODE or other specified condition to be entered, but has been performed within the specified Frequency (i.e., it is current) and is known not to be failed; or
- c. The Surveillance is required to be met, but not performed, in the MODE or other specified condition to be entered, and is known not to be failed.

Examples 1.4-3, 1.4-4, 1.4-5, and 1.4-6 discuss these special situations.

**INSERT 1A (BWR/4 and BWR/6)**

Some Surveillances contain notes that modify the Frequency of performance or the conditions during which the acceptance criteria must be satisfied. For these Surveillances, the MODE-entry restrictions of SR 3.0.4 may not apply. Such a Surveillance is not required to be performed prior to entering a MODE or other specified condition in the Applicability of the associated LCO if any of the following three conditions are satisfied:

- a. The Surveillance is not required to be met in the MODE or other specified condition to be entered; or
- b. The Surveillance is required to be met in the MODE or other specified condition to be entered, but has been performed within the specified Frequency (i.e., it is current) and is known not to be failed; or
- c. The Surveillance is required to be met, but not performed, in the MODE or other specified condition to be entered, and is known not to be failed.

Examples 1.4-3, 1.4-4, 1.4-5, and 1.4-6 discusses these special situations.

INSERT 2 (FYI: The source of this insert is NUREG-1433)EXAMPLE 1.4-4SURVEILLANCE REQUIREMENTS

| SURVEILLANCE  | FREQUENCY |
|---|-----------|
| <p style="text-align: center;">-----NOTE-----<br/>Only required to be met in MODE 1.<br/>-----</p> <p>Verify leakage rates are within limits.</p> | 24 hours  |

Example 1.4-4 specifies that the requirements of this Surveillance do not have to be met until the unit is in MODE 1. The interval measurement for the Frequency of this Surveillance continues at all times, as described in Example 1.4-1. However, the Note constitutes an "otherwise stated" exception to the Applicability of this Surveillance. Therefore, if the Surveillance were not performed within the 24 hour interval (plus the extension allowed by SR 3.0.2), but the unit was not in MODE 1, there would be no failure of the SR nor failure to meet the LCO. Therefore, no violation of SR 3.0.4 occurs when changing MODES, even with the 24 hour Frequency exceeded, provided the MODE change was not made into MODE 1. Prior to entering MODE 1 (assuming again that the 24 hour Frequency were not met), SR 3.0.4 would require satisfying the SR.

INSERT 3

EXAMPLES  
(continued)

EXAMPLE 1.4-[5]

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY     |
|--|---------------|
| <p>-----NOTE-----<br/>Only required to be performed in MODE 1.<br/>-----</p> |               |
| <p>Perform complete cycle of the valve.</p>                                  | <p>7 days</p> |

The interval continues, whether or not the unit operation is in MODE 1, 2, or 3 (the assumed Applicability of the associated LCO) between performances.

As the Note modifies the required performance of the Surveillance, the Note is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is not in MODE 1, this Note allows entry into and operation in MODES 2 and 3 to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency" if completed prior to entering MODE 1. Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by SR 3.0.2) interval, but operation was not in MODE 1, it would not constitute a failure of the SR or failure to meet the LCO. Also, no violation of SR 3.0.4 occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not result in entry into MODE 1.

Once the unit reaches MODE 1, the requirement for the Surveillance to be performed within its specified Frequency applies and would require that the Surveillance had been performed. If the Surveillance were not performed prior to entering MODE 1, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of SR 3.0.3 would apply.

INSERT 4EXAMPLE 1.4-[6]SURVEILLANCE REQUIREMENTS

| SURVEILLANCE  | FREQUENCY                                   |
|---|---|
| <p style="text-align: center;">-----NOTE-----<br/>           Not required to be met in MODE 3.<br/>           -----</p> <p>Verify parameter is within limits.</p> | <p style="text-align: center;">24 hours</p> |

Example 1.4-[6] specifies that the requirements of this Surveillance do not have to be met while the unit is in MODE 3 (the assumed Applicability of the associated LCO is MODES 1, 2, and 3). The interval measurement for the Frequency of this Surveillance continues at all times, as described in Example 1.4-1. However, the Note constitutes an "otherwise stated" exception to the Applicability of this Surveillance. Therefore, if the Surveillance were not performed within the 24 hour interval (plus the extension allowed by SR 3.0.2), and the unit was in MODE 3, there would be no failure of the SR nor failure to meet the LCO. Therefore, no violation of SR 3.0.4 occurs when changing MODES to enter MODE 3, even with the 24 hour Frequency exceeded, provided the MODE change does not result in entry into MODE 2. Prior to entering MODE 2 (assuming again that the 24 hour Frequency were not met), SR 3.0.4 would require satisfying the SR.

WOG AND CE ONLYInsert A

... Opening the block valve in this condition increases the risk of an unisolable leak from the RCS since the PORV is already inoperable.

¶ Note 2 modifies this SR to allow entry into and operation in MODE 3 prior to performing the SR. This allows the test to be performed in MODE 3 under operating temperature and pressure conditions, prior to entering MODE 1 or 2. [In accordance with Reference 4, administrative controls require this test be performed in MODE 3 or 4 to adequately simulate operating temperature and pressure effects on PORV operation.]

Insert B

The Note modifies this SR to allow entry into and operation in MODE 3 prior to performing the SR. This allows the test to be performed in MODE 3 under operating temperature and pressure conditions, prior to entering MODE 1 or 2. [In accordance with Reference 4, administrative controls require this test be performed in MODE 3 or 4 to adequately simulate operating temperature and pressure effects on PORV operation.]

Insert C

- [4. Generic Letter 90-06, 'Resolution of Generic Issue 70, 'Power-Operated Relief Valve and Block Valve Reliability,' and Generic Issue 94, 'Additional Low-Temperature Overpressure for Light-Water Reactors,' Pursuant to 10 CFR 50.54(f),' June 25, 1990.]

## 1.0 USE AND APPLICATION

### 1.4 Frequency

---

**PURPOSE** The purpose of this section is to define the proper use and application of Frequency requirements.

---

**DESCRIPTION** Each Surveillance Requirement (SR) has a specified Frequency in which the Surveillance must be met in order to meet the associated LCO. An understanding of the correct application of the specified Frequency is necessary for compliance with the SR.

The "specified Frequency" is referred to throughout this section and each of the Specifications of Section 3.0, Surveillance Requirement (SR) Applicability. The "specified Frequency" consists of the requirements of the Frequency column of each SR, as well as certain Notes in the Surveillance column that modify performance requirements.

Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated LCO is within its Applicability, represent potential SR 3.0.4 conflicts. To avoid these conflicts, the SR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With an SR satisfied, SR 3.0.4 imposes no restriction.

INSERT 1

### EXAMPLES

The following examples illustrate the various ways that Frequencies are specified. In these examples, the Applicability of the LCO (LCO not shown) is MODES 1, 2, and 3.

(continued)

1.4 Frequency

EXAMPLES  
(continued)

EXAMPLE 1.4-3

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY     |
|--|---------------|
| <p style="text-align: center;">-----NOTE-----<br/>Not required to be performed until<br/>12 hours after <math>\geq</math> 25% RTP.<br/>-----</p> |               |
| <p>Perform channel adjustment.</p>   | <p>7 days</p> |

The interval continues whether or not the unit operation is < 25% RTP between performances.

As the Note modifies the required performance of the Surveillance, it is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is < 25% RTP, this Note allows 12 hours after power reaches  $\geq$  25% RTP to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency." Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by SR 3.0.2) interval, but operation was < 25% RTP, it would not constitute a failure of the SR or failure to meet the LCO. Also, no violation of SR 3.0.4 occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not exceed 12 hours with power  $\geq$  25% RTP.

Once the unit reaches 25% RTP, 12 hours would be allowed for completing the Surveillance. If the Surveillance were not performed within this 12 hour interval, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of SR 3.0.3 would apply.

INSERT 2  
INSERT 3  
INSERT 4



SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.1.3.2</p> <p style="text-align: center;"><del>NOTE</del></p> <p>1. <del>This SR is not required to be performed prior to entry into MODE 1 or 2.</del></p> <p><del>2.</del> If the MTC is more negative than the COLR limit when extrapolated to the end of cycle, SR 3.1.3.2 may be repeated. Shutdown must occur prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit.</p> <p>Verify extrapolated MTC is within the lower limit specified in the COLR.</p> | <p>Each fuel cycle within 7 EFPDs after reaching an equilibrium boron concentration equivalent to 300 ppm</p> |

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY  |
|---|--|
| <p>SR 3.4.12.4 Verify pressurizer level is <math>\leq</math> [22] inches.</p>   | <p>30 minutes during RCS heatup and cooldown</p> <p><u>AND</u></p> <p>12 hours</p>   |
| <p>SR 3.4.12.5 Verify PORV block valve is open.</p>   | <p>12 hours</p>  |
| <p>SR 3.4.12.6</p> <p style="text-align: center;"><i>to be met</i></p> <p style="text-align: center;">-----NOTE-----</p> <p>Only required when complying with LCO 3.4.12.b.</p> <p>-----</p> <p>Verify RCS vent <math>\geq</math> [0.75] square inch is open.</p> | <p>12 hours for unlocked open vent valve(s)</p> <p><u>AND</u></p> <p>31 days for locked open vent valve(s)</p>   |
| <p>SR 3.4.12.7 Perform CHANNEL FUNCTIONAL TEST for PORV.</p>  | <p>Within [12] hours after decreasing RCS temperature to <math>\leq</math> [283]<math>^{\circ}</math>F</p> <p><u>AND</u></p> <p>31 days thereafter</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY                                  |
|---|--|
| <p>SR 3.7.5.1    Verify each EFW manual, power operated, and automatic valve in each water flow path and in both steam supply flow paths to the steam turbine driven pumps, that is not locked, sealed, or otherwise secured in position, is in the correct position.</p>   | <p>31 days</p>                             |
| <p>SR 3.7.5.2    -----NOTE-----<br/>                     Not required to be performed for the turbine driven EFW pumps, until [24] hours after reaching [800] psig in the steam generators.<br/>                     -----<br/>                     Verify the developed head of each EFW pump at the flow test point is greater than or equal to the required developed head.</p>  | <p>[31] days on a STAGGERED TEST BASIS</p> |
| <p>SR 3.7.5.3    -----NOTES-----<br/>                     1. Not required to be performed until [24] hours after reaching [800] psig in the steam generators.<br/>                     2. Not applicable in MODE 4. <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">required to be met</span><br/>                     -----<br/>                     Verify each EFW automatic valve that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.</p> | <p>[18] months</p>                         |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.7.5.4</p> <p>-----NOTES-----</p> <p>1. Not required to be performed until [24] hours after reaching [800] psig in the steam generators.</p> <p>2. Not <del>applicable</del> in MODE 4. <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">required to be met</span></p> <p>-----</p> <p>Verify each EFW pump starts automatically on an actual or simulated actuation signal.</p> | <p>[18] months</p>  |
| <p>SR 3.7.5.5</p> <p>Verify proper alignment of the required EFW flow paths by verifying [valve alignment/flow] from the condensate storage tank to each steam generator.</p>   | <p>Prior to entering MODE 2 whenever plant has been in MODE 5 or 6 for &gt; 30 days</p> |
| <p>[ SR 3.7.5.6</p> <p>Perform a CHANNEL FUNCTIONAL TEST for the EFW pump suction pressure interlocks.</p>  | <p>31 days ]</p>  |
| <p>[ SR 3.7.5.7</p> <p>Perform a CHANNEL CALIBRATION for the EFW pump suction pressure interlocks.</p>  | <p>[18] months ]</p>  |

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**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY   |
|--|-------------|
| SR 3.9.3.1 Verify each required containment penetration is in the required status.   | 7 days      |
| SR 3.9.3.2 Verify each required containment purge and exhaust valve actuates to the isolation position on an actual or simulated actuation signal. | [18] months |

----- NOTE -----  
Not required to be met for containment  
purge and exhaust valves in penetrations  
closed to comply with LCO C.1.  
-----

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BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.1.3.2 (continued)

check on the most negative (least positive) MTC value. The measurement is performed at any THERMAL POWER equivalent to an RCS boron concentration of 300 ppm (for steady state operation at RTP with all CONTROL RODS fully withdrawn) so that the projected EOC MTC may be evaluated before the reactor actually reaches the EOC condition. MTC values are extrapolated and compensated to permit direct comparison to the specified MTC limits.

The SR is modified by <sup>a</sup> two Notes. ~~Note 1 indicates performance of SR 3.1.3.2 is not required prior to entering MODE 1 or 2. Although this Surveillance is applicable in MODES 1 and 2, the reactor must be critical before the Surveillance can be completed. Therefore, entry into the applicable MODE, prior to accomplishing the Surveillance, is necessary.~~

The Note

~~Note 2~~ indicates that SR 3.1.3.2 may be repeated, and shutdown must occur, prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit. The minimum allowable boron concentration is obtained from the EOC MTC versus boron concentration slope with appropriate conservatism. Thus, the projected EOC MTC is evaluated before the lower limit is actually reached.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 11.
2. FSAR, Chapter [14].
3. FSAR, Section [ ].
4. FSAR, Section [ ].

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BASES

---

SURVEILLANCE  
REQUIREMENTS

SR 3.4.12.4 (continued)

variations. This Frequency may be discontinued when the ends of these conditions are satisfied, as defined in plant procedures. Thereafter, the Surveillance is required at 12 hour intervals.

These Frequencies are shown by operating practice sufficient to regularly assess indications of potential degradation and verify operation within the safety analysis.

SR 3.4.12.5

Verification that the PORV block valve is open ensures a flow path to the PORV. This is required at 12 hour intervals.

The interval has been shown by operating practice sufficient to regularly assess conditions for potential degradation and verify operation is within the safety analysis.

SR 3.4.12.6

When stipulated by LCO 3.4.12.b, the RCS vent of at least [0.75] square inches must be verified open for relief protection. For a vent valve not locked open, the Frequency is every 12 hours. For a valve locked open, the required Frequency is every 31 days.

Again, the Frequency intervals consider operating practice to determine adequacy to regularly assess conditions for potential degradation and verify operation within the safety analysis.

*to only be met*

A Note modifies the SR by requiring the Surveillance when complying with LCO 3.4.12.b.

SR 3.4.12.7

A CHANNEL FUNCTIONAL TEST is required within [12] hours after decreasing RCS temperature to  $\leq$  [283] $^{\circ}$ F and every 31 days thereafter to ensure the setpoint is proper for

(continued)

BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.7.5.3 (continued)

unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. The [18] month Frequency is also acceptable based on operating experience and design reliability of the equipment. This SR is modified by a Note that states the SR is not required in MODE 4. In MODE 4, the required AFW train is already aligned and operating. This SR is modified by [a] [two] Note[s]. [Note 1 indicates that the SR be deferred until suitable test conditions are established. This deferral is required because there is insufficient steam pressure to perform the test.] [The] Note [2] states that the SR is not required in MODE 4. [In MODE 4, the required pump is already operating and the autostart function is not required.] [In MODE 4, the heat removal requirements would be less providing more time for operator action to manually start the required AFW pump.]

to be met

SR 3.7.5.4

This SR verifies that the turbine driven EFW pumps start in the event of any accident or transient that generates an SFRCS signal by demonstrating that each turbine driven EFW pump starts automatically on an actual or simulated actuation signal. These pumps are not required in MODE 4. The [18] month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. This SR is modified by [a] [two] Note[s]. [Note 1 indicates that the SR be deferred until suitable test conditions are established. This deferral is required because there is insufficient steam pressure to perform the test.] [The] Note [2] states that the SR is not required in MODE 4. [In MODE 4, the required pump is already operating and the autostart function is not required.] [In MODE 4, the heat removal requirements would be less providing more time for operator action to manually start the required AFW pump.]

to be met

Reviewer's Note: Some plants may not routinely use the AFW for heat removal in MODE 4. The second justification is provided for plants that use a startup feedwater pump rather than AFW for startup and shutdown.

(continued)



## BASES

SURVEILLANCE  
REQUIREMENTSSR 3.9.3.1 (continued)

radioactivity within the containment will not result in a release of fission product radioactivity to the environment.

SR 3.9.3.2

This Surveillance demonstrates that each containment purge and exhaust valve actuates to its isolation position on manual initiation or on an actual or simulated high radiation signal. The 18 month Frequency maintains consistency with other similar ESFAS instrumentation and valve testing requirements. In LCO 3.3.15, "RB Purge Isolation" High Radiation, the isolation instrumentation requires a CHANNEL CHECK every 12 hours and a CHANNEL FUNCTIONAL TEST every 92 days to ensure the channel OPERABILITY during refueling operations. Every 18 months a CHANNEL CALIBRATION is performed. The system actuation response time is demonstrated every 18 months, during refueling, on a STAGGERED TEST BASIS. SR 3.6.3.5 demonstrates that the isolation time of each valve is in accordance with the Inservice Testing Program requirements. These Surveillances performed during MODE 6 will ensure that the valves are capable of closing after a postulated fuel handling accident to limit a release of fission product radioactivity from the containment.

## REFERENCES

1. GPU Nuclear Safety Evaluation SE-0002000-001, Rev. 0, May 20, 1988.
2. FSAR, Section [ ].
3. NUREG-0800, Section 15.7.4, Rev. 1, July 1981.

The SR is modified by a Note stating that this Surveillance is not required to be met for valves in isolated penetrations. The LCO provides the option to close penetrations in lieu of requiring automatic actuation capability.

1.0 USE AND APPLICATION

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1.4 Frequency

---

**PURPOSE**                      The purpose of this section is to define the proper use and application of Frequency requirements.

---

**DESCRIPTION**                Each Surveillance Requirement (SR) has a specified Frequency in which the Surveillance must be met in order to meet the associated LCO. An understanding of the correct application of the specified Frequency is necessary for compliance with the SR.

The "specified Frequency" is referred to throughout this section and each of the Specifications of Section 3.0, Surveillance Requirement (SR) Applicability. The "specified Frequency" consists of the requirements of the Frequency column of each SR as well as certain Notes in the Surveillance column that modify performance requirements.

Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated LCO is within its Applicability, represent potential SR 3.0.4 conflicts. To avoid these conflicts, the SR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With an SR satisfied, SR 3.0.4 imposes no restriction.

INSERT ↓

---

**EXAMPLES**                      The following examples illustrate the various ways that Frequencies are specified. In these examples, the Applicability of the LCO (LCO not shown) is MODES 1, 2, and 3.

(continued)

1.4 Frequency

EXAMPLES  
(continued)

EXAMPLE 1.4-3

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE  | FREQUENCY     |
|---|---------------|
| <p style="text-align: center;"><del>NOTE</del></p> <p>Not required to be performed until 12 hours after <math>\geq 25\%</math> RTP.</p> |               |
| <p>Perform channel adjustment.</p>  | <p>7 days</p> |

The interval continues, whether or not the unit operation is  $< 25\%$  RTP between performances.

As the Note modifies the required performance of the Surveillance, it is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is  $< 25\%$  RTP, this Note allows 12 hours after power reaches  $\geq 25\%$  RTP to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency." Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by SR 3.0.2) interval, but operation was  $< 25\%$  RTP, it would not constitute a failure of the SR or failure to meet the LCO. Also, no violation of SR 3.0.4 occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not exceed 12 hours with power  $\geq 25\%$  RTP.

Once the unit reaches 25% RTP, 12 hours would be allowed for completing the Surveillance. If the Surveillance were not performed within this 12 hour interval, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of SR 3.0.3 would apply.

INSERT 2  
INSERT 3  
INSERT 4

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**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE |  | FREQUENCY  |
|--------------|--|--|
| SR 3.1.11.1  | <p><i>to be met</i></p> <p>-----NOTE-----<br/>Only required for control rods not fully inserted.</p> <p>-----</p> <p>Determine the position of each control rod.</p>   | 2 hours  |
| SR 3.1.11.2  | <p><i>to be met</i></p> <p>-----NOTE-----<br/>Only required for control rods not fully inserted.</p> <p>-----</p> <p>Trip each control rod from <math>\geq</math> the 50% withdrawn position, and verify full control rod insertion.</p> | Within 24 hours prior to reducing SDM outside limits |

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**ACTIONS**

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| F. (continued)  | F.2 Restore one block valve to OPERABLE status [if three block valves are inoperable]. | 2 hours         |
|   | AND<br>F.3 Restore remaining block valve(s) to OPERABLE status.                        | 72 hours        |
| G. Required Action and associated Completion Time of Condition F not met. | G.1 Be in MODE 3.  | 6 hours         |
|   | AND<br>G.2 Be in MODE 4.   | 12 hours        |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY  |
|---|--|
| <p>SR 3.4.11.1 <sup>performed</sup> <sup>(S)</sup> <sup>NOTE</sup><br/>                     Not required to be <sup>(S)</sup> met with block valve closed in accordance with the Required Action of Condition B or F <sup>this LCO</sup></p> <p>Perform a complete cycle of each block valve.</p> | <p>2. Only required to be performed in MODES 1 and 2.</p> <p>92 days</p> |
| <p>SR 3.4.11.2 Perform a complete cycle of each PORV.</p>   | <p>[18] months</p>   |

NOTE  
Only required to be performed in MODES 1 and 2.

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY   |
|---|---|
| <p>SR 3.4.12.4 Verify RHR suction valve is open for each required RHR suction relief valve.</p>   | <p>12 hours</p>   |
| <p>SR 3.4.12.5 -----NOTE-----<br/>Only required to be <u>performed</u> when complying with LCO 3.4.12.b.<br/><br/>Verify RCS vent <math>\geq</math> [2.07] square inches open.</p>  | <p>12 hours for unlocked open vent valve(s)<br/><br/><u>AND</u><br/>31 days for locked open vent valve(s)</p> |
| <p>SR 3.4.12.6 Verify PORV block valve is open for each required PORV.</p>  | <p>72 hours</p>   |
| <p>SR 3.4.12.7 Verify associated RHR suction isolation valve is locked open with operator power removed for each required RHR suction relief valve.</p>   | <p>31 days</p>  |
| <p>SR 3.4.12.8 -----NOTE-----<br/>Not required to be <u>performed</u> until 12 hours after decreasing RCS cold leg temperature to <math>\leq</math> [275]°F.<br/><br/>Perform a COT on each required PORV, excluding actuation.</p> | <p>31 days</p>  |

(continued)

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY   |
|---|-------------|
| SR 3.9.4.1    Verify each required containment penetration is in the required status.   | 7 days      |
| SR 3.9.4.2    Verify each required containment purge and exhaust valve actuates to the isolation position on an actual or simulated actuation signal. | [18] months |

----- NOTE -----

Not required to be met for containment purge and exhaust valve(s) in penetrations closed to comply with LCO C.1.

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BASES (continued)

---

**SURVEILLANCE  
REQUIREMENTS**

SR 3.1.11.1

In order to establish an acceptable SDM during the measurement of control rod worths, it is necessary to know the position of each control rod. A test Frequency of 2 hours is reasonable, based on normal control rod motion during control rod worth measurements.

SR 3.1.11.1 has been modified by a Note establishing that the position of only those control rods not fully inserted must be determined. It is assumed that the position and worth of fully inserted control rods is known.

SR 3.1.11.2

One of the assumptions made in granting an STE for SDM, is that all control rods not fully inserted will fully insert when tripped. This Surveillance is performed to verify that fact.

The Frequency of 24 hours prior to reducing the plant SDM below the normal requirements is acceptable, based on the assumption that the control rods will remain OPERABLE and trippable for 24 hours and during the performance of the test.

SR 3.1.11.2 has been modified by a Note establishing that this Surveillance is only required for control rods not fully inserted. During the performance of control rod worth measurements, certain control rods remain fully inserted. Since these rods are not relied on to trip, there is no need to demonstrate that they will fully insert when tripped.

to be met

---

REFERENCES

1. 10 CFR 50, Appendix B, Section XI.
  2. 10 CFR 50.59.
  3. Regulatory Guide 1.68, Revision 2, August 1978.
  4. ANSI/ANS-19.6.1-1985, December 13, 1985.
  5. FSAR, Chapter [14].
- 
-



BASES (continued)

APPLICABILITY

In MODES 1, 2, and 3, the PORV and its block valve are required to be OPERABLE to limit the potential for a small break LOCA through the flow path. The most likely cause for a PORV small break LOCA is a result of a pressure increase transient that causes the PORV to open. Imbalances in the energy output of the core and heat removal by the secondary system can cause the RCS pressure to increase to the PORV opening setpoint. The most rapid increases will occur at the higher operating power and pressure conditions of MODES 1 and 2. The PORVs are also required to be OPERABLE in MODES 1, 2, and 3 to minimize challenges to the pressurizer safety valves.

Pressure increases are less prominent in MODE 3 because the core input energy is reduced, but the RCS pressure is high. Therefore, the LCO is applicable in MODES 1, 2, and 3. The LCO is not applicable in MODE 4 when both pressure and core energy are decreased and the pressure surges become much less significant. The PORV setpoint is reduced for LTOP in MODES 4, 5, and 6 with the reactor vessel head in place. LCO 3.4.12 addresses the PORV requirements in these MODES.

ACTIONS

Note 1 has been added to clarify that all pressurizer PORVs are treated as separate entities, each with separate Completion Times (i.e., the Completion Time is on a component basis). The exception for LCO 3.0.4, Note 2, permits entry into MODES 1, 2, and 3 to perform cycling of the PORVs or block valves to verify their OPERABLE status, *in the event*

*that* Testing ~~is~~ *was* not performed in lower MODES. *satisfactorily*

A.1

With the PORVs inoperable and capable of being manually cycled, either the PORVs must be restored or the flow path isolated within 1 hour. The block valves should be closed but power must be maintained to the associated block valves, since removal of power would render the block valve inoperable. Although a PORV may be designated inoperable, it may be able to be manually opened and closed, and therefore, able to perform its function. PORV inoperability may be due to seat leakage, instrumentation problems, automatic control problems, or other causes that do not prevent manual use and do not create a possibility for a

(continued)

BASES (continued)

SURVEILLANCE  
REQUIREMENTS

SR 3.4.11.1

Block valve cycling verifies that the valve(s) can be closed if needed. The basis for the Frequency of 92 days is the ASME Code, Section XI (Ref. 3). ~~If the block valve is closed to isolate a PORV that is capable of being manually cycled, the OPERABILITY of the block valve is of importance, because opening the block valve is necessary to permit the PORV to be used for manual control of reactor pressure. If the block valve is closed to isolate an otherwise inoperable PORV, the maximum Completion Time to restore the PORV and open the block valve is 72 hours, which is well within the allowable limits (25%) to extend the block valve Frequency of 92 days. Furthermore, these test requirements would be completed by the reopening of a recently closed block valve upon restoration of the PORV to OPERABLE status (i.e., completion of the Required Actions fulfills the SR).~~

This SR is modified by two Notes

Performed

<sup>1</sup> The Note modifies this SR by stating that it is not required to be met with the block valve closed in accordance with the Required Actions of this LCO.

Insert A

SR 3.4.11.2

SR 3.4.11.2 requires a complete cycle of each PORV. Operating a PORV through one complete cycle ensures that the PORV can be manually actuated for mitigation of an SGTR. The Frequency of [18] months is based on a typical refueling cycle and industry accepted practice.

Insert B

SR 3.4.11.3

Operating the solenoid air control valves and check valves on the air accumulators ensures the PORV control system actuates properly when called upon. The Frequency of [18] months is based on a typical refueling cycle and the Frequency of the other Surveillances used to demonstrate PORV OPERABILITY.

SR 3.4.11.4

This Surveillance is not required for plants with permanent 1E power supplies to the valves.

(continued)

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BASES

**SURVEILLANCE  
REQUIREMENTS**

**SR 3.4.11.4 (continued)**

The Surveillance demonstrates that emergency power can be provided and is performed by transferring power from normal to emergency supply and cycling the valves. The Frequency of [18] months is based on a typical refueling cycle and industry accepted practice.

**REFERENCES**

1. Regulatory Guide 1.32, February 1977.
2. FSAR, Section [15.2].
3. ASME, Boiler and Pressure Vessel Code, Section XI.

INSERT C

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BASES

**SURVEILLANCE  
REQUIREMENTS**

SR 3.4.12.4 (continued)

The RHR suction valve is verified to be opened every 12 hours. The Frequency is considered adequate in view of other administrative controls such as valve status indications available to the operator in the control room that verify the RHR suction valve remains open.

The ASME Code, Section XI (Ref. 8), test per Inservice Testing Program verifies OPERABILITY by proving proper relief valve mechanical motion and by measuring and, if required, adjusting the lift setpoint.

SR 3.4.12.5

The RCS vent of  $\geq [2.07]$  square inches is proven OPERABLE by verifying its open condition either:

- a. Once every 12 hours for a valve that cannot be locked.
- b. Once every 31 days for a valve that is locked, sealed, or secured in position. A removed pressurizer safety valve fits this category.

The passive vent arrangement must only be open to be OPERABLE. This Surveillance is required to be performed if the vent is being used to satisfy the pressure relief requirements of the LCO 3.4.12b. <sup>ynet</sup>

SR 3.4.12.6

The PORV block valve must be verified open every 72 hours to provide the flow path for each required PORV to perform its function when actuated. The valve must be remotely verified open in the main control room. [This Surveillance is performed if the PORV satisfies the LCO.]

The block valve is a remotely controlled, motor operated valve. The power to the valve operator is not required removed, and the manual operator is not required locked in the inactive position. Thus, the block valve can be closed in the event the PORV develops excessive leakage or does not close (sticks open) after relieving an overpressure situation.

(continued)

BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.4.12.6 (continued)

The 72 hour Frequency is considered adequate in view of other administrative controls available to the operator in the control room, such as valve position indication, that verify that the PORV block valve remains open.

SR 3.4.12.7

Each required RHR suction relief valve shall be demonstrated OPERABLE by verifying its RHR suction valve and RHR suction isolation valve are open and by testing it in accordance with the Inservice Testing Program. (Refer to SR 3.4.12.4 for the RHR suction valve Surveillance and for a description of the requirements of the Inservice Testing Program.) This Surveillance is only performed if the RHR suction relief valve is being used to satisfy this LCO.

Every 31 days the RHR suction isolation valve is verified locked open, with power to the valve operator removed, to ensure that accidental closure will not occur. The "locked open" valve must be locally verified in its open position with the manual actuator locked in its inactive position. The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve position.

SR 3.4.12.8

Performance of a COT is required within 12 hours after decreasing RCS temperature to  $\leq [275]^{\circ}\text{F}$  and every 31 days on each required PORV to verify and, as necessary, adjust its lift setpoint. The COT will verify the setpoint is within the PTLR allowed maximum limits in the PTLR. PORV actuation could depressurize the RCS and is not required.

The 12 hour Frequency considers the unlikelihood of a low temperature overpressure event during this time.

Perform

A Note has been added indicating that this SR is required to be ~~met~~ performed 12 hours after decreasing RCS cold leg temperature to  $\leq [275]^{\circ}\text{F}$ . The COT cannot be performed until in the LTOP MODES when the PORV lift setpoint can be reduced to the LTOP

(continued)

BASES

**SURVEILLANCE  
REQUIREMENTS**

SR 3.9.4.1 (continued)

demonstrate that each valve operator has motive power, which will ensure that each valve is capable of being closed by an OPERABLE automatic containment purge and exhaust isolation signal.

The Surveillance is performed every 7 days during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment. The Surveillance interval is selected to be commensurate with the normal duration of time to complete fuel handling operations. A surveillance before the start of refueling operations will provide two or three surveillance verifications during the applicable period for this LCO. As such, this Surveillance ensures that a postulated fuel handling accident that releases fission product radioactivity within the containment will not result in a release of fission product radioactivity to the environment.

SR 3.9.4.2

This Surveillance demonstrates that each containment purge and exhaust valve actuates to its isolation position on manual initiation or on an actual or simulated high radiation signal. The 18 month Frequency maintains consistency with other similar ESFAS instrumentation and valve testing requirements. In LCO 3.3.6, the Containment Purge and Exhaust Isolation instrumentation requires a CHANNEL CHECK every 12 hours and a COT every 92 days to ensure the channel OPERABILITY during refueling operations. Every 18 months a CHANNEL CALIBRATION is performed. The system actuation response time is demonstrated every 18 months, during refueling, on a STAGGERED TEST BASIS. SR 3.6.3.5 demonstrates that the isolation time of each valve is in accordance with the Inservice Testing Program requirements. These Surveillances performed during MODE 6 will ensure that the valves are capable of closing after a postulated fuel handling accident to limit a release of fission product radioactivity from the containment.

*The SR is modified by a Note stating that this Surveillance is not required to be met for valves in isolated penetrations. The LCO provides the option to close penetrations in lieu of requiring automatic actuation capability.*

(continued)

## 1.0 USE AND APPLICATION

### 1.4 Frequency

---

**PURPOSE** The purpose of this section is to define the proper use and application of Frequency requirements.

---

**DESCRIPTION** Each Surveillance Requirement (SR) has a specified Frequency in which the Surveillance must be met in order to meet the associated LCO. An understanding of the correct application of the specified Frequency is necessary for compliance with the SR.

The "specified Frequency" is referred to throughout this section and each of the Specifications of Section 3.0, Surveillance Requirement (SR) Applicability. The "specified Frequency" consists of the requirements of the Frequency column of each SR, as well as certain Notes in the Surveillance column that modify performance requirements.

Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated LCO is within its Applicability, represent potential SR 3.0.4 conflicts. To avoid these conflicts, the SR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With an SR satisfied, SR 3.0.4 imposes no restriction.

INSERT 1

### EXAMPLES

The following examples illustrate the various ways that Frequencies are specified. In these examples, the Applicability of the LCO (LCO not shown) is MODES 1, 2, and 3.

1.4 Frequency

EXAMPLES  
(continued)

EXAMPLE 1.4-3

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY     |
|--|---------------|
| <p>-----NOTE-----<br/>                     Not required to be performed until<br/>                     12 hours after <math>\geq</math> 25% RTP.<br/>                     -----</p> <p>Perform channel adjustment.</p> | <p>7 days</p> |

The interval continues, whether or not the unit operation is < 25% RTP between performances.

As the Note modifies the required performance of the Surveillance, it is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is < 25% RTP, this Note allows 12 hours after power reaches  $\geq$  25% RTP to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency." Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by SR 3.0.2) interval, but operation was < 25% RTP, it would not constitute a failure of the SR or failure to meet the LCO. Also, no violation of SR 3.0.4 occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not exceed 12 hours with power  $\geq$  25% RTP.

Once the unit reaches 25% RTP, 12 hours would be allowed for completing the Surveillance. If the Surveillance were not performed within this 12 hour interval, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of SR 3.0.3 would apply.

INSERT 2  
 INSERT 3 →  
 INSERT 4



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3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Moderator Temperature Coefficient (MTC) (Analog)

LCO 3.1.4 The MTC shall be maintained within the limits specified in the COLR. The maximum positive limit shall be that specified in Figure 3.1.4-1.

APPLICABILITY: MODES 1 and 2.

ACTIONS

| CONDITION                 | REQUIRED ACTION   | COMPLETION TIME |
|---------------------------|-------------------|-----------------|
| A. MTC not within limits. | A.1 Be in MODE 3. | 6 hours         |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.1.4.1</p> <p><del>NOTE<br/>This Surveillance is not required to be performed prior to entry into MODE 2.</del></p> <p>Verify MTC is within the upper limits specified in the COLR.</p> | <p>Prior to entering MODE 1 after each fuel loading</p> |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| <p>SR 3.1.4.2</p> <p style="text-align: center;">-----NOTED-----</p> <p><del>1. This Surveillance is not required to be performed prior to entry into MODE 1 or 2.</del></p> <p>✗ If the MTC is more negative than the COLR limit when extrapolated to the end of cycle, SR 3.1.4.2 may be repeated. Shutdown must occur prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit.</p> <p>-----</p> <p>Verify MTC is within the lower limit specified in the COLR.</p> | <p>Each fuel cycle within 7 effective full power days (EFPD) of reaching 40 EFPD core burnup</p> <p><u>AND</u></p> <p>Each fuel cycle within 7 EFPD of reaching <math>\frac{2}{3}</math> of expected core burnup</p> |

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3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Moderator Temperature Coefficient (MTC) (Digital)

LCO 3.1.4 The MTC shall be maintained within the limits specified in the COLR, and a maximum positive limit as specified below:

- a. [0.5 E-4 Δk/k/°F] when THERMAL POWER is ≤ 70% RTP; and
- b. [0.0 Δk/k/°F] when THERMAL POWER is > 70% RTP.

APPLICABILITY: MODES 1 and 2.

ACTIONS

| CONDITION                 | REQUIRED ACTION   | COMPLETION TIME |
|---------------------------|-------------------|-----------------|
| A. MTC not within limits. | A.1 Be in MODE 3. | 6 hours         |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| <p>SR 3.1.4.1</p> <p><del>-----NOTE-----</del><br/> <del>This surveillance is not required to be performed prior to entry into MODE 2.</del></p> <p>Verify MTC within the upper limit specified in the COLR.</p> | <p>Prior to entering MODE 1 after each fuel loading</p> |

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE  | FREQUENCY  |
|---|--|
| <p>SR 3.1.4.2</p> <p style="text-align: center;">.....NOTES.....</p> <p><del>1. This Surveillance is not required to be performed prior to entry into MODE 1 or 2.</del></p> <p><del>X</del> If the MTC is more negative than the COLR limit when extrapolated to the end of cycle, SR 3.1.4.2 may be repeated. Shutdown must occur prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit.</p> <p>.....</p> <p>Verify MTC is within the lower limit specified in the COLR.</p> | <p>Each fuel cycle within 7 effective full power days (EFPD) of reaching 40 EFPD core burnup</p> <p><u>AND</u></p> <p>Each fuel cycle within 7 EFPD of reaching <math>\frac{2}{3}</math> of expected core burnup</p> |

Regulating CEA Insertion Limits (Analog)  
3.1.7

*TSTF-284 REV 2*

**ACTIONS**

| CONDITION  | REQUIRED ACTION   | COMPLETION TIME             |
|--|-------------------|-----------------------------|
| D. (continued)   |                   | Once per 4 hours thereafter |
| E. Required Action and associated Completion Time not met. | E.1 Be in MODE 3. | 6 hours                     |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY |
|---|-----------|
| SR 3.1.7.1 .....NOTE.....<br><del>This Surveillance is not required to be performed prior to entry into MODE 2.</del><br><i>until 12 hours after</i><br>Verify each regulating CEA group position is within its insertion limits. | 12 hours  |
| SR 3.1.7.2 Verify the accumulated times during which the regulating CEA groups are inserted beyond the steady state insertion limits but within the transient insertion limits.   | 24 hours  |
| SR 3.1.7.3 Verify PDIL alarm circuit is OPERABLE.   | 31 days   |

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**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY       |
|--|-----------------|
| <p>SR 3.1.7.1</p> <p>-----NOTE-----<br/> <del>This Surveillance is not required to be performed prior to entry into MODE 2.</del><br/>                     -----<br/> <i>until 12 hours after</i><br/>                     Verify each regulating CEA group position is within its insertion limits.</p> | <p>12 hours</p> |
| <p>SR 3.1.7.2</p> <p>Verify the accumulated times during which the regulating CEA groups are inserted beyond the steady state insertion limits but within the transient insertion limits.</p>  | <p>24 hours</p> |
| <p>SR 3.1.7.3</p> <p>Verify PDIL alarm circuit is OPERABLE.</p>  | <p>31 days</p>  |

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**SURVEILLANCE REQUIREMENTS**

-----NOTE-----  
 Either the Excore Detector Monitoring System or the Incore Detector Monitoring System shall be used to determine LHR.  
 -----

| SURVEILLANCE  | FREQUENCY      |
|---|----------------|
| <p style="text-align: center;">required to be met</p> <p>SR 3.2.1.1</p> <p style="text-align: center;">-----NOTE-----</p> <p>Only <u>applicable</u> when the Excore Detector Monitoring System is being used to determine LHR.</p> <p style="text-align: center;">-----</p> <p>Verify ASI alarm setpoints are within the limits specified in Figure 3.2.2-2 (ASI Operating Limits) in the COLR.</p>   | <p>31 days</p> |
| <p style="text-align: center;">required to be met</p> <p>SR 3.2.1.2</p> <p style="text-align: center;">-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. Only <u>applicable</u> when the Incore Detector Monitoring System is being used to determine LHR.</li> <li>2. Not required to be performed below 20% RTP.</li> </ol> <p style="text-align: center;">-----</p> <p>Verify incore detector local power density alarms satisfy the requirements of the core power distribution map, which shall be updated at least once per 31 days of accumulated operation in MODE 1.</p> | <p>31 days</p> |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE   | FREQUENCY                                  |
|--|--|
| <p style="text-align: center;"><u>required to be met</u></p> <p>SR 3.2.1.3</p> <p style="text-align: center;">-----NOTES-----</p> <ol style="list-style-type: none"><li>1. Only <u>applicable</u> when the Incore Detector Monitoring System is being used to determine LHR.</li><li>2. Not required to be performed below 20% RTP.</li></ol> <p>-----</p> <p>Verify incore detector local power density alarm setpoints are less than or equal to the limits specified in the COLR.</p> | <p style="text-align: center;">31 days</p> |



**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY      |
|--|----------------|
| <p style="text-align: center;"><b>required to be met</b></p> <p>SR 3.2.1.1      -----NOTE-----<br/>                     Only <del>applicable</del> when COLSS is out of service. With COLSS in service, LHR is continuously monitored.</p> <p>-----</p> <p>Verify LHR, as indicated on each OPERABLE local power density channel, is <math>\leq</math> [13.9 kW/ft].</p> | <p>2 hours</p> |
| <p>SR 3.2.1.2      Verify the COLSS margin alarm actuates at a THERMAL POWER equal to or less than the core power operating limit based on LHR.</p>  | <p>31 days</p> |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE |   | FREQUENCY |
|--------------|---|-----------|
| SR 3.2.3.1   | <p style="text-align: center;"><u>required to be met</u></p> <p style="text-align: center;">-----NOTES-----</p> <p>Only <u>applicable</u> when COLSS is out of service. With COLSS in service, this parameter is continuously monitored.</p> <p>-----</p> <p>Calculate T<sub>q</sub> and verify it is within the limit.</p> | 12 hours  |
| SR 3.2.3.2   | Verify COLSS azimuthal tilt alarm is actuated at a T <sub>q</sub> value less than the T <sub>q</sub> value used in the CPCs.  | 31 days   |
| SR 3.2.3.3   | Independently confirm the validity of the COLSS calculated T <sub>q</sub> by use of the incore detectors.   | 31 EFPD   |

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**ACTIONS (continued)**

| CONDITION  | REQUIRED ACTION                                 | COMPLETION TIME |
|--|---|-----------------|
| B. DNBR outside the region of acceptable operation when COLSS is out of service. | B.1 Initiate SR 3.2.4.1.                        | 15 minutes      |
|  | <u>AND</u><br>B.2 Restore DNBR to within limit. | 4 hours         |
| C. Required Action and associated Completion Time not met.                       | C.1 Reduce THERMAL POWER to $\leq$ 20% RTP.     | 6 hours         |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY  |
|--|------------|
| <p>SR 3.2.4.1</p> <p style="text-align: center;">to be met</p> <p style="text-align: center;">-----NOTE-----</p> <p>Only required with COLSS not in service and DNBR not within specified limits using any CPC channel.</p> <p style="text-align: center;">-----</p> <p>Verify no adverse trend in DNBR.</p> | 15 minutes |

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY      |
|---|----------------|
| <p>SR 3.2.4.2</p> <p style="text-align: center;"><i>required to be met</i></p> <p>-----NOTE-----<br/>                     Only <i>applicable</i> when COLSS is out of service. With COLSS in service, this parameter is continuously monitored.<br/>                     -----</p> <p>Verify DNBR, as indicated on all OPERABLE DNBR channels, is within the limit of Figure 3.2.4-1 or 3.2.4-2 of the COLR, as applicable.</p> | <p>2 hours</p> |
| <p>SR 3.2.4.3</p> <p>Verify COLSS margin alarm actuates at a THERMAL POWER level equal to or less than the core power operating limit based on DNBR.</p>  | <p>31 days</p> |

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE   | FREQUENCY      |
|--|----------------|
| <p>SR 3.3.8.3</p> <p><i>Only required to be met</i></p> <p>NOTE<br/> <del>This SR is applicable</del> in MODES 1, 2, 3, and 4 only.</p> <p>Perform a CHANNEL FUNCTIONAL TEST on each required containment radiation monitor channel. Verify setpoint [Allowable Value] is in accordance with the following:</p> <p>Containment Gaseous Monitor: ≤ [2X background]<br/>           Containment Particulate Monitor: ≤ [2X background]<br/>           Containment Area Gamma Monitor: ≤ [325 mR/hr]</p>   | <p>92 days</p> |
| <p>SR 3.3.8.4</p> <p><i>Only required to be met</i></p> <p>NOTE<br/> <del>This SR is only applicable</del> during CORE ALTERATIONS or during movement of irradiated fuel assemblies within containment.</p> <p>Perform a CHANNEL FUNCTIONAL TEST on required containment radiation monitor channel. Verify setpoint [Allowable Value] is in accordance with the following:</p> <p>Containment Gaseous Monitor: ≤ [2X background]<br/>           Containment Particulate Monitor: ≤ [2X background]<br/>           Containment Iodine Monitor: ≤ [2X background]<br/>           Containment Area Gamma Monitor: ≤ [2X background]</p> | <p>92 days</p> |

(continued)

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**ACTIONS**

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| F. (continued)  | F.2 Restore at least one block valve to OPERABLE status. | 2 hours         |
| G. Required Action and associated Completion Time of Condition F not met. | G.1 Be in MODE 3.  | 6 hours         |
|   | G.2 Be in MODE 4.  | [12] hours      |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY   |
|--|---|
| SR 3.4.11.1 <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">1.</span> -----NOTE <sup>5</sup> -----<br>Not required to be performed with block valve closed in accordance with the Required Actions of this LCO. | 2. Only required to be performed in MODES 1 and 2.                      |
| Perform a complete cycle of each block valve.  | [92 days]   |
| SR 3.4.11.2 Perform a complete cycle of each PORV.   | [18] months   |
| <span style="border: 1px solid black; padding: 2px;">SR 3.4.11.3</span> Perform a complete cycle of each solenoid air control valve and check valve on the air accumulators in PORV control systems.                                     | <span style="border: 1px solid black; padding: 2px;">[18] months</span> |

(continued)

Note -----  
 Only required to be performed in MODES 1 and 2.

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**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY                                  |
|--|--|
| <p>SR 3.7.5.1    Verify each AFW manual, power operated, and automatic valve in each water flow path and in both steam supply flow paths to the steam turbine driven pump, that is not locked, sealed, or otherwise secured in position, is in the correct position.</p>   | <p>31 days</p>                             |
| <p>SR 3.7.5.2    -----NOTE-----<br/>                     Not required to be performed for the turbine driven AFW pump until [24] hours after reaching [800] psig in the steam generators.<br/>                     -----<br/>                     Verify the developed head of each AFW pump at the flow test point is greater than or equal to the required developed head.</p>   | <p>[31] days on a STAGGERED TEST BASIS</p> |
| <p>SR 3.7.5.3    -----NOTES-----<br/>                     1. Not required to be performed for the turbine driven AFW pump until [24] hours after reaching [800] psig in the steam generators.<br/>                     2. Not <u>applicable</u> in MODE 4 when steam generator is relied upon for heat removal.<br/>                     -----<br/>                     Verify each AFW automatic valve that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.</p> | <p>[18] months</p>                         |

required to be met

(continued)

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**SURVEILLANCE REQUIREMENTS (continued)**

| SURVEILLANCE  | FREQUENCY  |
|---|--|
| <p>SR 3.7.5.4</p> <p>-----NOTES-----</p> <p>1. Not required to be performed for the turbine driven AFW pump until [24] hours after reaching [800] psig in the steam generators.</p> <p>2. Not <u>applicable</u> in MODE 4 when steam generator is relied upon for heat removal.</p> <p>-----</p> <p>Verify each AFW pump starts automatically on an actual or simulated actuation signal when in MODE 1, 2, or 3.</p> | <p>[18] months</p>   |
| <p>SR 3.7.5.5</p> <p>Verify the proper alignment of the required AFW flow paths by verifying flow from the condensate storage tank to each steam generator.</p>   | <p>Prior to entering MODE 2 whenever unit has been in MODE 5 or 6 for &gt; 30 days</p> |

required to be met



**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY   |
|--|-------------|
| SR 3.9.3.1 Verify each required containment penetration is in the required status.   | 7 days      |
| SR 3.9.3.2 Verify each required containment purge and exhaust valve actuates to the isolation position on an actual or simulated actuation signal. | [18] months |

----- NOTE -----  
 Not required to be met for containment  
 purge and exhaust valve(s) in penetrations  
 closed to comply with LCO C.1.  
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REV 3

BASES

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APPLICABILITY  
(continued)

temperature assumed in the safety analysis, is accepted as valid once the BOC and MOC measurements are used for normalization.

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ACTIONS

A.1

MTC is a function of the fuel and fuel cycle designs, and cannot be controlled directly once the designs have been implemented in the core. If MTC exceeds its limits, the reactor must be placed in MODE 3. This eliminates the potential for violation of the accident analysis bounds. The associated Completion Time of 6 hours is reasonable, considering the probability of an accident occurring during the time period that would require an MTC value within the LCO limits, and the time for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.1.4.1 and SR 3.1.4.2

The SRs for measurement of the MTC at the beginning and middle of each fuel cycle provide for confirmation of the limiting MTC values. The MTC changes smoothly from most positive (least negative) to most negative value during fuel cycle operation, as the RCS boron concentration is reduced to compensate for fuel depletion. The requirement for measurement prior to operation > 5% RTP satisfies the confirmatory check on the most positive (least negative) MTC value. The requirement for measurement, within 7 days after reaching 40 effective full power days and 1/2 core burnup, satisfies the confirmatory check of the most negative MTC value. The measurement is performed at any THERMAL POWER, so that the projected EOC MTC may be evaluated before the reactor actually reaches the EOC condition. MTC values may be extrapolated and compensated to permit direct comparison to the specified MTC limits.

SR 3.1.4.2 is modified by a Note that indicates performance is not required prior to entering MODE 1 or 2. Although this Surveillance is applicable in MODES 1 and 2, the reactor must be critical before the Surveillance can be

(continued)

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TSTF-284 REV B

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.1.4.1 and SR 3.1.4.2 (continued)

~~completed. Therefore, entry into the applicable MODE prior to accomplishing the Surveillance is necessary.~~

SR 3.1.4.2 is modified by a ~~second~~ Note, which indicates that if the extrapolated MTC is more negative than the EOC COLR limit, the Surveillance may be repeated, and that shutdown must occur prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit. An engineering evaluation is performed if the extrapolated value of MTC exceeds the Specification limits.

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REFERENCES

1. 10 CFR 50, Appendix A, GDC 11.
  2. FSAR, Section [ ].
  3. FSAR, Section [ ].
  4. FSAR, Section [ ].
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BASES

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APPLICABILITY  
(continued)

temperature assumed in the safety analysis, is accepted as valid once the BOC and MOC measurements are used for normalization.

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ACTIONS

A.1

MTC is a function of the fuel and fuel cycle designs, and cannot be controlled directly once the designs have been implemented in the core. If MTC exceeds its limits, the reactor must be placed in MODE 3. This eliminates the potential for violation of the accident analysis bounds. The associated Completion Time of 6 hours is reasonable, considering the probability of an accident occurring during the time period that would require an MTC value within the LCO limits, and the time for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.1.4.1 and SR 3.1.4.2

The SRs for measurement of the MTC at the beginning and middle of each fuel cycle provide for confirmation of the limiting MTC values. The MTC changes smoothly from most positive (least negative) to most negative value during fuel cycle operation, as the RCS boron concentration is reduced to compensate for fuel depletion. The requirement for measurement prior to operation > 5% RTP satisfies the confirmatory check on the most positive (least negative) MTC value. The requirement for measurement, within 7 days after reaching 40 effective full power days and a 1/2 core burnup, satisfies the confirmatory check of the most negative MTC value. The measurement is performed at any THERMAL POWER so that the projected EOC MTC may be evaluated before the reactor actually reaches the EOC condition. MTC values may be extrapolated and compensated to permit direct comparison to the specified MTC limits.

SR 3.1.4.2 is modified by a Note that indicates performance is not required prior to entering MODE 1 or 2. Although this Surveillance is applicable in MODES 1 and 2 the reactor must be critical before the Surveillance can be

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.1.4.1 and SR 3.1.4.2 (continued)

completed. Therefore, entry into the applicable MODE prior to accomplishing the Surveillance is necessary.

SR 3.1.4.2 is modified by a ~~second~~ Note, which indicates that if extrapolated MTC is more negative than the EOC COLR limit, the Surveillance may be repeated, and that shutdown must occur prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit. An engineering evaluation is performed if the extrapolated value of MTC exceeds the Specification limits.

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REFERENCES

1. 10 CFR 50, Appendix A, GDC 11.
  2. FSAR, Section [ ].
  3. FSAR, Section [ ].
  4. FSAR, Section [ ].
- 
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TSTF-284 REV B

BASES

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ACTIONS

C.1 (continued)

regulating CEAs to withdraw to the acceptable region. It is reasonable to continue operation for 2 hours after it is discovered that the 5 day or 14 day EFPD limit has been exceeded. This Completion Time is based on limiting the potential xenon redistribution, the low probability of an accident, and the steps required to complete the action.

D.1

When the PDIL alarm circuit is inoperable, performing SR 3.1.7.1 within 1 hour and once per 4 hours thereafter ensures improper CEA alignments are identified before unacceptable flux distributions occur.

E.1

When a Required Action cannot be completed within the required Completion Time, a controlled shutdown should be commenced. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

---

SURVEILLANCE  
REQUIREMENTS

SR 3.1.7.1

With the PDIL alarm circuit OPERABLE, verification of each regulating CEA group position every 12 hours is sufficient to detect CEA positions that may approach the acceptable limits, and to provide the operator with time to undertake the Required Action(s) should the sequence or insertion limits be found to be exceeded. The 12 hour Frequency also takes into account the indication provided by the PDIL alarm circuit and other information about CEA group positions available to the operator in the control room.

SR 3.1.7.1 is modified by a Note indicating that entry is allowed into MODE 2 for 12 hours without having performed the SR. This is necessary, since the unit must be in the applicable MODES in order to perform Surveillances that demonstrate the LCO limits are met.

(continued)

TSTF-284 REV 3

BASES

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ACTIONS

E.1 (continued)

MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

---

SURVEILLANCE  
REQUIREMENTS

SR 3.1.7.1

With the PDIL alarm circuit OPERABLE, verification of each regulating CEA group position every 12 hours is sufficient to detect CEA positions that may approach the acceptable limits, and provides the operator with time to undertake the Required Action(s) should the sequence or insertion limits be found to be exceeded. The 12 hour Frequency also takes into account the indication provided by the PDIL alarm circuit and other information about CEA group positions available to the operator in the control room.

SR 3.1.7.1 is modified by a Note <sup>for 12 hours</sup> indicating that entry is allowed into MODE 2 without having performed the SR. This is necessary, since the unit must be in the applicable MODES in order to perform Surveillances that demonstrate the LCO limits are met.

SR 3.1.7.2

Verification of the accumulated time of CEA group insertion between the long term steady state insertion limits and the transient insertion limits ensures the cumulative time limits are not exceeded. The 24 hour Frequency ensures the operator identifies a time limit that is being approached before it is reached.

SR 3.1.7.3

Demonstrating the PDIL alarm circuit OPERABLE verifies that the PDIL alarm circuit is functional. The 31 day Frequency takes into account other Surveillances being performed at shorter Frequencies that identify improper CEA alignments.

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(continued)

BASES

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ACTIONS

A.1 (continued)

specified limits. One hour to restore the LHR to within its specified limits is reasonable and ensures that the core does not continue to operate in this Condition. The 1 hour Completion Time also allows the operator sufficient time for evaluating core conditions and for initiating proper corrective actions.

B.1

If the LHR cannot be returned to within its specified limits, THERMAL POWER must be reduced. The change to MODE 2 ensures that the core is operating within its thermal limits and places the core in a conservative condition. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 2 from full power MODE 1 conditions in an orderly manner and without challenging plant systems.

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SURVEILLANCE  
REQUIREMENTS

A Note was added to the SRs to require LHR to be determined by either the Excure Detector Monitoring System or the Incore Detector Monitoring System.

SR 3.2.1.1

Performance of this SR verifies that the Excure Detector Monitoring System can accurately monitor the LHR. Therefore, this SR is only applicable when the Excure Detector Monitoring System is being used to determine the LHR. The 31 day Frequency is appropriate for this SR because it is consistent with the requirements of SR 3.3.1.3 for calibration of the excure detectors using the incore detectors.

required  
to be  
met

The SR is modified by a Note that states that the SR is only ~~applicable~~ when the Excure Detection Monitoring System is being used to determine LHR. The reason for the Note is that the excure detectors input neutron flux information into the ASI calculation.

(continued)



BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.2.1.2 and SR 3.2.1.3

Continuous monitoring of the LHR is provided by the Incore Detector Monitoring System and the Excore Detector Monitoring System. Either of these two core power distribution monitoring systems provides adequate monitoring of the core power distribution and is capable of verifying that the LHR does not exceed its specified limits.

Performance of these SRs verifies that the Incore Detector Monitoring System can accurately monitor LHR. Therefore, they are only applicable when the Incore Detector Monitoring System is being used to determine the LHR.

A 31 day Frequency is consistent with the historical testing frequency of the reactor monitoring system. The SRs are modified by two Notes. Note 1 allows the SRs to be met ~~performed~~ only when the Incore Detector Monitoring System is being used to determine LHR. Note 2 states that the SRs are not required to be performed when THERMAL POWER is < 20% RTP. The accuracy of the neutron flux information from the incore detectors is not reliable at THERMAL POWER < 20% RTP.

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REFERENCES

1. FSAR, Chapter [15].
  2. FSAR, Chapter [6].
  3. 10 CFR 50, Appendix A.
  4. 10 CFR 50.46.
-

BASES

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ACTIONS

C.1 (continued)

inoperability, core power must be reduced. Reduction of core power to < 20% RTP ensures that the core is operating within its thermal limits and places the core in a conservative condition based on the trip setpoints generated by the CPCs, which assume a minimum core power of 20% RTP. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach 20% RTP in an orderly manner and without challenging plant systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.2.1.1

With the COLSS out of service, the operator must monitor the LHR with each OPERABLE local power density channel. A 2 hour Frequency is sufficient to allow the operator to identify trends that would result in an approach to the LHR limits.

required  
to be met

This SR is modified by a Note that states that the SR is applicable only when the COLSS is out of service. Continuous monitoring of the LHR is provided by the COLSS, which calculates core power and core power operating limits based on the LHR and continuously displays these limits to the operator. A COLSS margin alarm is annunciated in the event that the THERMAL POWER exceeds the core power operating limit based on LHR.

SR 3.2.1.2

Verification that the COLSS margin alarm actuates at a THERMAL POWER level equal to or less than the core power operating limit based on the LHR in units of kilowatts per foot ensures the operator is alerted when conditions approach the LHR operating limit.

The 31 day Frequency for performance of this SR is consistent with the historical testing frequency of reactor protection and monitoring systems. The Surveillance Frequency for testing protection systems was extended to 92 days by CEN 327. Monitoring systems were not addressed in CEN 327; therefore, this Frequency remains at 31 days.

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(continued)

BASES (continued)

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SURVEILLANCE  
REQUIREMENTS

SR 3.2.4.1

With the COLSS out of service, the operator must monitor the DNBR as indicated on any of the OPERABLE DNBR channels of the CPCs to verify that the DNBR is within the specified limits, shown in either Figure 3.2.4-1 or 3.2.4-2 of the COLR, as applicable. A 2 hour Frequency is adequate to allow the operator to identify trends in conditions that would result in an approach to the DNBR limit.

required  
to be met

This SR is modified by a Note that states that the SR is only applicable when the COLSS is out of service. Continuous monitoring of the DNBR is provided by the COLSS, which calculates core power and core power operating limits based on the DNBR and continuously displays these limits to the operator. A COLSS margin alarm is annunciated in the event that the THERMAL POWER exceeds the core power operating limit based on the DNBR.

SR 3.2.4.2

Verification that the COLSS margin alarm actuates at a power level equal to or less than the core power operating limit, as calculated by the COLSS, based on the DNBR, ensures that the operator is alerted when operating conditions approach the DNBR operating limit. The 31 day Frequency for performance of this SR is consistent with the historical testing frequency of reactor protection and monitoring systems. The Surveillance Frequency for testing protection systems was extended to 92 days by CEN 327. Monitoring systems were not addressed in CEN 327; therefore, this Frequency remains at 31 days.

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REFERENCES

1. FSAR, Chapter [15].
2. FSAR, Chapter [6].
3. CE-1 Correlation for DNBR.
4. 10 CFR 50, Appendix A, GDC 10.
5. 10 CFR 50.46.

(continued)

BASES

**SURVEILLANCE  
REQUIREMENTS**

SR 3.3.8.3 (continued)

(Ref. 4). The Frequency of 92 days is based on plant operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given Function in any 92 day Frequency is a rare event.

A Note to the SR indicates this Surveillance is applicable in MODES 1, 2, 3, and 4 only.

required to be met

SR 3.3.8.4

A CHANNEL FUNCTIONAL TEST is performed on the required containment radiation monitoring channel to ensure the entire channel will perform its intended function. Setpoints must be found within the Allowable Values specified in SR 3.3.8.4 and left consistent with the assumptions of the plant specific setpoint methodology (Ref. 4). The Frequency of 92 days is based on plant operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given Function in any 92 day interval is a rare event.

A Note to the SR indicates that this test is only applicable during CORE ALTERATIONS or during movement of irradiated fuel assemblies within containment.

required to be met

SR 3.3.8.5

Proper operation of the individual initiation relays is verified by actuating these relays during the CHANNEL FUNCTIONAL TEST of the Actuation Logic every [18] months. This will actuate the Function, operating all associated equipment. Proper operation of the equipment actuated by each train is thus verified. The Frequency of [18] months is based on plant operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given Function during any [18] month interval is a rare event. A Note to the SR indicates that this Surveillance includes verification of operation for each initiation relay.

(continued)

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REV 3

BASES

APPLICABILITY  
(continued)

MODES 4, 5, and 6 with the reactor vessel head in place.  
LCO 3.4.12 addresses the PORV requirements in these MODES.

ACTIONS

A.1

The ACTIONS are modified by two Notes. Note 1 clarifies that all pressurizer PORVs are treated as separate entities, each with separate Completion Times (i.e., the Completion Time is on a component basis). Note 2 is an exception to LCO 3.0.4. The exception for LCO 3.0.4 permits entry into MODES 1, 2, and 3 to perform cycling of the PORV or block valve to verify their OPERABLE status. Testing is typically not performed in lower MODES.

in the event that testing was not satisfactorily performed in lower MODES.

With the PORV inoperable and capable of being manually cycled, either the PORV must be restored or the flow path isolated within 1 hour. The block valve should be closed but power must be maintained to the associated block valve, since removal of power would render the block valve inoperable. Although the PORV may be designated inoperable, it may be able to be manually opened and closed and in this manner can be used to perform its function. PORV inoperability may be due to seat leakage, instrumentation problems, automatic control problems, or other causes that do not prevent manual use and do not create a possibility for a small break LOCA. For these reasons, the block valve may be closed but the Action requires power be maintained to the valve. This Condition is only intended to permit operation of the plant for a limited period of time not to exceed the next refueling outage (MODE 6) so that maintenance can be performed on the PORVs to eliminate the problem condition. The PORVs should normally be available for automatic mitigation of overpressure events and should be returned to OPERABLE status prior to entering startup (MODE 2).

Quick access to the PORV for pressure control can be made when power remains on the closed block valve. The Completion Time of 1 hour is based on plant operating experience that minor problems can be corrected or closure can be accomplished in this time period.

(continued)

BASES

TSTF-284

REV 3

ACTIONS

F.1 and F.2 (continued)

control is reasonable based on the small potential for challenges to the system during this time and provides the operator time to correct the situation.

G.1 and G.2

If the Required Actions and associated Completion Times of Condition E or F are not met, then the plant must be brought to a MODE in which the LCO does not apply. The plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging safety systems. Similarly, the Completion Time of 12 hours to reach MODE 4 is reasonable considering that a plant can cool down within that time frame on one safety system train. In MODES 4 and 5, maintaining PORV OPERABILITY may be required. See LCO 3.4.12.

SURVEILLANCE  
REQUIREMENTS

SR 3.4.11.1

Block valve cycling verifies that it can be closed if necessary. The basis for the Frequency of [92 days] is ASME XI (Ref. 3). ~~If the block valve is closed to isolate a PORV that is capable of being manually cycled, the OPERABILITY of the block valve is of importance because opening the block valve is necessary to permit the PORV to be used for manual control of reactor pressure. If the block valve is closed to isolate an otherwise inoperable PORV, the maximum Completion Time to restore the PORV and open the block valve is 72 hours, which is well within the allowable limits (25%) to extend the block valve surveillance interval of [92 days]. Furthermore, these test requirements would be completed by the reopening of a recently closed block valve upon restoration of the PORV to OPERABLE status (i.e., completion of the Required Action fulfills the SR).~~

This SR is modified by two Notes.

<sup>1</sup> The Note modifies this SR by stating that this SR is not required to be performed with the block valve closed in accordance with the Required Actions of this LCO.

Insert A

(continued)

BASES

**SURVEILLANCE  
REQUIREMENTS  
(continued)**

SR 3.4.11.2

SR 3.4.11.2 requires complete cycling of each PORV. PORV cycling demonstrates its function. The Frequency of [18] months is based on a typical refueling cycle and industry accepted practice.

INSECT B →

SR 3.4.11.3

Operating the solenoid air control valves and check valves on the air accumulators ensures the PORV control system actuates properly when called upon. The Frequency of [18] months is based on a typical refueling cycle and the Frequency of the other surveillances used to demonstrate PORV OPERABILITY.

SR 3.4.11.4

This Surveillance is not required for plants with permanent IE power supplies to the valves. The test demonstrates that emergency power can be provided and is performed by transferring power from the normal supply to the emergency supply and cycling the valves. The Frequency of [18] months is based on a typical refueling cycle and industry accepted practice.

REFERENCES

1. NUREG-0737, Paragraph III, G.I, November 1980.
2. Inspection and Enforcement (IE) Bulletin 79-05B, April 21, 1979.
3. ASME, Boiler and Pressure Vessel Code, Section XI.

↑  
Insert C

BASES

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**SURVEILLANCE  
REQUIREMENTS**

SR 3.7.5.2 (continued)

TEST BASIS results in testing each pump once every 3 months, as required by Reference 2.

This SR is modified by a Note indicating that the SR should be deferred until suitable test conditions are established. This deferral is required because there is an insufficient steam pressure to perform the test.

SR 3.7.5.3

This SR ensures that AFW can be delivered to the appropriate steam generator, in the event of any accident or transient that generates an EFAS signal, by demonstrating that each automatic valve in the flow path actuates to its correct position on an actual or simulated actuation signal. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The [18] month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. The 18 month Frequency is acceptable, based on the design reliability and operating experience of the equipment.

This SR is modified by a Note indicating that the SR should be deferred until suitable test conditions have been established. This deferral is required because there is an insufficient steam pressure to perform the test.

Also, this SR is modified by a Note that states the SR is not required in MODE 4. In MODE 4, the required AFW train is already aligned and operating.

to be met

SR 3.7.5.4

This SR ensures that the AFW pumps will start in the event of any accident or transient that generates an EFAS signal by demonstrating that each AFW pump starts automatically on an actual or simulated actuation signal. The [18] month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the

(continued)



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BASES

**SURVEILLANCE  
REQUIREMENTS**

**SR 3.7.5.4 (continued)**

potential for an unplanned transient if the Surveillance were performed with the reactor at power. The 18 month Frequency is acceptable, based on the design reliability and operating experience of the equipment.

This SR is modified by [a] [two] Note[s]. [Note 1 indicates that the SR be deferred until suitable test conditions are established. This deferral is required because there is insufficient steam pressure to perform the test.] [The] Note [2] states that the SR is not required in MODE 4. [In MODE 4, the required pump is already operating and the autostart function is not required.] [In MODE 4, the heat removal requirements would be less providing more time for operator action to manually start the required AFW pump.]

to be met

Reviewer's Note: Some plants may not routinely use the AFW for heat removal in MODE 4. The second justification is provided for plants that use a startup feedwater pump rather than AFW for startup and shutdown.

**SR 3.7.5.5**

This SR ensures that the AFW System is properly aligned by verifying the flow path to each steam generator prior to entering MODE 2 operation, after 30 days in MODE 5 or 6. OPERABILITY of AFW flow paths must be verified before sufficient core heat is generated that would require the operation of the AFW System during a subsequent shutdown. The Frequency is reasonable, based on engineering judgment, and other administrative controls to ensure that flow paths remain OPERABLE. To further ensure AFW System alignment, the OPERABILITY of the flow paths is verified following extended outages to determine that no misalignment of valves has occurred. This SR ensures that the flow path from the CST to the steam generators is properly aligned by requiring a verification of minimum flow capacity of 750 gpm at 1270 psi. (This SR is not required by those units that use AFW for normal startup and shutdown.)

(continued)

TSEF-284,  
Au3

BASES

**SURVEILLANCE  
REQUIREMENTS**

SR 3.9.3.1 (continued)

**OPERABLE** automatic containment purge and exhaust isolation signal.

The Surveillance is performed every 7 days during CORE ALTERATIONS or movement of irradiated fuel assemblies within the containment. The Surveillance interval is selected to be commensurate with the normal duration of time to complete fuel handling operations. A surveillance before the start of refueling operations will provide two or three surveillance verifications during the applicable period for this LCO. As such, this Surveillance ensures that a postulated fuel handling accident that releases fission product radioactivity within the containment will not result in a release of fission product radioactivity to the environment.

SR 3.9.3.2

This Surveillance demonstrates that each containment purge and exhaust valve actuates to its isolation position on manual initiation or on an actual or simulated high radiation signal. The 18 month Frequency maintains consistency with other similar ESFAS instrumentation and valve testing requirements. In LCO 3.3.4 [(Digital) or 3.3.3 (Analog)], "Miscellaneous Actuators," the Containment Purge Isolation Signal System requires a CHANNEL CHECK every 7 days and a CHANNEL FUNCTIONAL TEST every 31 days to ensure the channel OPERABILITY during refueling operations. Every 18 months a CHANNEL CALIBRATION is performed. The system actuation response time is demonstrated every 18 months, during refueling, on a STAGGERED TEST BASIS. SR 3.6.3.5 demonstrates that the isolation time of each valve is in accordance with the Inservice Testing Program requirements. These surveillances performed during MODE 6 will ensure that the valves are capable of closing after a postulated fuel handling accident to limit a release of fission product radioactivity from the containment.

*The SR is modified by a Note stating that this Surveillance is not required to be met for valves in isolated penetrations. The LCO provides the option to close penetrations in lieu of requiring automatic actuation capability.*

(continued)

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## 1.0 USE AND APPLICATION

### 1.4 Frequency

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**PURPOSE** The purpose of this section is to define the proper use and application of Frequency requirements.

---

**DESCRIPTION** Each Surveillance Requirement (SR) has a specified Frequency in which the Surveillance must be met in order to meet the associated LCO. An understanding of the correct application of the specified Frequency is necessary for compliance with the SR.

The "specified Frequency" is referred to throughout this section and each of the Specifications of Section 3.0, Surveillance Requirement (SR) Applicability. The "specified Frequency" consists of the requirements of the Frequency column of each SR, as well as certain Notes in the Surveillance column that modify performance requirements.

Sometimes special situations dictate when the requirements of a Surveillance are to be met. They are "otherwise stated" conditions allowed by SR 3.0.1. They may be stated as clarifying Notes in the Surveillance, as part of the Surveillance, or both. Example 1.4-4 discusses these special situations.

Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated LCO is within its Applicability, represent potential SR 3.0.4 conflicts. To avoid these conflicts, the SR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With an SR satisfied, SR 3.0.4 imposes no restriction.

The use of "met" or "performed" in these instances conveys specific meanings. A Surveillance is "met" only when the acceptance criteria are satisfied. Known failure of the requirements of a Surveillance, even without a Surveillance specifically being "performed," constitutes a Surveillance not "met." "Performance" refers only to the requirement to specifically determine the ability to meet the acceptance

(continued)

1.4 Frequency

TSTF-284 Rev 3

EXAMPLES

EXAMPLE 1.4-3 (continued)

Once the unit reaches 25% RTP, 12 hours would be allowed for completing the Surveillance. If the Surveillance were not performed within this 12 hour interval, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of SR 3.0.3 would apply.

EXAMPLE 1.4-4

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY       |
|--|-----------------|
| <p>-----NOTE-----<br/>Only required to be met in MODE 1.<br/>-----</p> |                 |
| <p>Verify leakage rates are within limits.</p>                         | <p>24 hours</p> |

Example 1.4-4 specifies that the requirements of this Surveillance do not have to be met until the unit is in MODE 1. The interval measurement for the Frequency of this Surveillance continues at all times, as described in Example 1.4-1. However, the Note constitutes an "otherwise stated" exception to the Applicability of this Surveillance. Therefore, if the Surveillance were not performed within the 24 hour interval (plus the extension allowed by SR 3.0.2), but the unit was not in MODE 1, there would be no failure of the SR nor failure to meet the LCO. Therefore, no violation of SR 3.0.4 occurs when changing MODES, even with the 24 hour Frequency exceeded, provided the MODE change was not made into MODE 1. Prior to entering MODE 1 (assuming again that the 24 hour Frequency were not met), SR 3.0.4 would require satisfying the SR.

INSERT 3 →  
INSERT 4 →

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## 1.0 USE AND APPLICATION

### 1.4 Frequency

---

**PURPOSE** The purpose of this section is to define the proper use and application of Frequency requirements.

---

**DESCRIPTION** Each Surveillance Requirement (SR) has a specified Frequency in which the Surveillance must be met in order to meet the associated LCO. An understanding of the correct application of the specified Frequency is necessary for compliance with the SR.

The "specified Frequency" is referred to throughout this section and each of the Specifications of Section 3.0, Surveillance Requirement (SR) Applicability. The "specified Frequency" consists of the requirements of the Frequency column of each SR, as well as certain Notes in the Surveillance column that modify performance requirements.

Sometimes special situations dictate when the requirements of a Surveillance are to be met. They are "otherwise stated" conditions allowed by SR 3.0.1. They may be stated as clarifying Notes in the Surveillance, as part of the Surveillance, or both. Example 1.4-4 discusses these special situations.

Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated LCO is within its Applicability, represent potential SR 3.0.4 conflicts. To avoid these conflicts, the SR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With an SR satisfied, SR 3.0.4 imposes no restriction.

The use of "met" or "performed" in these instances conveys specified meanings. A Surveillance is "met" only when the acceptance criteria are satisfied. Known failure of the requirements of a Surveillance, even without a Surveillance specifically being "performed," constitutes a Surveillance not "met." "Performance" refers only to the requirement to specifically determine the ability to meet the acceptance

(continued)

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1.4 Frequency

EXAMPLES

EXAMPLE 1.4-3 (continued)

Once the unit reaches 25% RTP, 12 hours would be allowed for completing the Surveillance. If the Surveillance were not performed within this 12 hour interval, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of SR 3.0.3 would apply.

EXAMPLE 1.4-4

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY |
|--|-----------|
| <p>-----NOTE-----<br/>Only required to be met in MODE 1.<br/>-----</p> |           |
| Verify leakage rates are within limits.                                | 24 hours  |

Example 1.4-4 specifies that the requirements of this Surveillance do not have to be met until the unit is in MODE 1. The interval measurement for the Frequency of this Surveillance continues at all times, as described in Example 1.4-1. However, the Note constitutes an "otherwise stated" exception to the Applicability of this Surveillance. Therefore, if the Surveillance were not performed within the 24 hour interval (plus the extension allowed by SR 3.0.2) interval, but the unit was not in MODE 1, there would be no failure of the SR nor failure to meet the LCO. Therefore, no violation of SR 3.0.4 occurs when changing MODES, even with the 24 hour Frequency exceeded, provided the MODE change was not made into MODE 1. Prior to entering MODE 1 (assuming again that the 24 hour Frequency were not met), SR 3.0.4 would require satisfying the SR.

INSERT 3 →  
INSERT 4

## Industry/TSTF Standard Technical Specification Change Traveler

### Define "Operations Involving Positive Reactivity Additions"

Classification: 3) Improve Specifications

NUREGs Affected:  1430  1431  1432  1433  1434

**Description:**

Most Actions requiring "Suspend operations involving positive reactivity additions"; various Notes precluding reduction in boron concentration; and RCS isolated loop startup limit for the isolated loop to be at a boron concentration greater than or equal to the operating loop(s), are revised to limit the introduction into the RCS of reactivity more positive than that required to meet the required SDM or refueling boron concentration, as applicable.

Additionally, the remaining Actions that require suspension of positive reactivity changes have a Bases addition to clarify that the intent is a "net" positive reactivity operation.

Note that TSTF-286 incorporates the combination of LCO 3.1.1 and 3.1.2 approved in TSTF-136.

**Justification:**

The Actions that preclude positive reactivity changes and/or reduction in boron concentration are ensuring either no power increases, or continued margin to core criticality operations. During conditions in which these Actions may be required, various unit operations must be continued. RCS inventory must be maintained, and RCS temperature must be controlled. These activities necessarily involve additions to the RCS of cooler water (a positive reactivity effect in most cases) and may involve inventory makeup from sources that are at boron concentrations less than RCS concentration. These activities should not be precluded if the worst-case overall effect on the core would still assure SDM (or the required refueling boron concentration) is maintained.

Therefore, the proposed changes provides the flexibility necessary to provide for continued safe reactor operations, while also limiting any potential for excess positive reactivity addition.

|                   |                  |                |                         |
|-------------------|------------------|----------------|-------------------------|
| Industry Contact: | Buschbaum, Denny | (254) 897-5851 | dbuschb1@tuelectric.com |
| NRC Contact:      | Tomlinson, Ed    | 301-314-3137   | ebt@nrc.gov             |

### Revision History

**OG Revision 0** **Revision Status: Closed**

Revision Proposed by: WOG

Revision Description:  
Original Issue

#### Owners Group Review Information

Date Originated by OG: 20-Nov-97

Owners Group Comments  
(No Comments)

Owners Group Resolution: Approved Date: 20-Nov-97

#### TSTF Review Information

TSTF Received Date: 20-Nov-97 Date Distributed for Review 06-Jan-98

1/11/00

**OG Revision 0****Revision Status: Closed**OG Review Completed:  BWOG  WOG  CEOG  BWROG**TSTF Comments:**

2/5/98 - Enhance justification by including information on problems created by current wording. The CEOG and BWOG chairmen will review and approve changes prior to submittal.

TSTF Resolution: Approved Date: 10-Jul-98

**NRC Review Information**

NRC Received Date: 25-Sep-98

**NRC Comments:**

4/22/99 - TSTF to provide a revised TSTF by 5/13/99 with a revised Note.

6/16/99 - Denny B to provide information to Ed Thomlinson.

Final Resolution: NRC Action Pending

Final Resolution Date:

**TSTF Revision 1****Revision Status: Closed**

Revision Proposed by: NRC

**Revision Description:**

Revised the Traveler to incorporate NRC comments. Instead of revising the Required Action, a Note is added.

**TSTF Review Information**

TSTF Received Date: 01-Jul-99

Date Distributed for Review 27-Sep-99

OG Review Completed:  BWOG  WOG  CEOG  BWROG**TSTF Comments:**

(No Comments)

TSTF Resolution: Approved Date: 29-Sep-99

**NRC Review Information**

NRC Received Date: 20-Oct-99

**NRC Comments:**

12/21/99 - NRC provided comments in their letter dated 12/21/99 which pointed out a number of inconsistencies in the proposed Traveler. The following inconsistencies have been noted in the CEOG portion of the submittal.

LCO 3.4.7 Insert 5 should refer to LCO 3.1.2, not LCO 3.1.1. LCO 3.1.2 addresses SDM in Mode 5. Insert 3 to the Required Actions of Condition B should refer to LCO 3.1.2, not LCO 3.1.1.

LCO 3.4.8 Insert 5 should refer to LCO 3.1.2, not LCO 3.1.1. LCO 3.1.2 addresses SDM in Mode 5. Insert 3 to the Required Actions of Condition B should refer to LCO 3.1.2, not LCO 3.1.1.

Bases Pg B3.4-31 The proposed change to this LCO 3.4.7 Bases should reference LCO 3.1.2, not LCO 3.1.1. LCO 3.4.7 is applicable in Mode 5 and LCO 3.1.2 addresses SDM in Mode 5.

1/11/00



**TSTF Revision 1**

**Revision Status: Closed**

Bases Pg B3.4-33 Proposed inserts B4 and B5 to this LCO 3.4.7 bases should address LCO 3.1.2, not LCO 3.1.1.

Base Pg B3.4-36 The proposed change to this LCO 3.4.8 Bases should reference LCO 3.1.2, not LCO 3.1.1. LCO 3.4.8 is applicable in Mode 5, and LCO 3.1.2 addresses SDM in Mode 5.

Bases Pg B3.4-37 Inserts B4 and B5 to this LCO 3.4.8 Bases should reference LCO 3.1.2, not LCO 3.1.1.

Bases Pg B3.9-3 It appears that Insert B12 is being added to the wrong Action. Insert B12 should be added to the Bases discussion for Actions A.1 and A.2.

Bases Pg B3.9-6 Inserts B4 and B5 should reference the boron concentration requirements of LCO 3.9.1. LCO 3.9.2 is applicable in Mode 6, and LCO 3.9.1 addresses boron concentration requirements in Mode 6.

It appears that there are similar problems in the WOG and BWOG portions of the submittal. The OG's should review these portions of the submittal to identify and correct any inconsistencies. The OG's should consider reviewing the TSB markup of Rev. 0 of TSTF-286 for the correct references.

Insert 4 of the submittal should be changed to read "the boron concentration requirements of LCO 3.9.1" as opposed to "SDM of LCO 3.9.1."

Final Resolution: Superseded by Revision

Final Resolution Date:

**TSTF Revision 2**

**Revision Status: Active**

**Next Action: NRC**

Revision Proposed by: NRC

Revision Description:

Revised to incorporate NRC comments. Note, as pointed out in the revised justification, TSTF-286 incorporates the combination of LCO 3.1.1 and 3.1.2 approved in TSTF-136.

**TSTF Review Information**

TSTF Received Date: 11-Jan-00 Date Distributed for Review 11-Jan-00

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 11-Jan-00

**NRC Review Information**

NRC Received Date: 11-Jan-00

NRC Comments:

(No Comments)

Final Resolution: NRC Action Pending

Final Resolution Date:

**Incorporation Into the NUREGs**

1/11/00

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

**Affected Technical Specifications**

|                      |                                      |
|----------------------|--------------------------------------|
| LCO 3.4.5            | RCS Loops - MODE3                    |
| LCO 3.4.5 Bases      | RCS Loops - MODE3                    |
| LCO 3.4.6            | RCS Loops - MODE 4                   |
| LCO 3.4.6 Bases      | RCS Loops - MODE 4                   |
| Action 3.4.6.C       | RCS Loops - MODE 4                   |
| Action 3.4.6.C Bases | RCS Loops - MODE 4                   |
| LCO 3.4.7            | RCS Loops - MODE 5, Loops Filled     |
| LCO 3.4.7 Bases      | RCS Loops - MODE 5, Loops Filled     |
| Action 3.4.7.B       | RCS Loops - MODE 5, Loops Filled     |
| Action 3.4.7.B Bases | RCS Loops - MODE 5, Loops Filled     |
| LCO 3.4.8            | RCS Loops - MODE 5, Loops Not Filled |
| LCO 3.4.8 Bases      | RCS Loops - MODE 5, Loops Not Filled |
| LCO 3.4.8.B          | RCS Loops - MODE 5, Loops Not Filled |
| LCO 3.4.8.B Bases    | RCS Loops - MODE 5, Loops Not Filled |
| Action 3.8.2.A       | AC Sources - Shutdown                |
| Action 3.8.2.A Bases | AC Sources - Shutdown                |
| Action 3.8.2.B       | AC Sources - Shutdown                |
| Action 3.8.5.A       | DC Sources - Shutdown                |
| Action 3.8.5.A Bases | DC Sources - Shutdown                |
| LCO 3.8.8.A          | Inverters - Shutdown                 |
| LCO 3.8.8.A Bases    | Inverters - Shutdown                 |
| Action 3.8.10        | Distribution Systems - Shutdown      |
| Action 3.8.10 Bases  | Distribution Systems - Shutdown      |
| Action 3.9.1.A Bases | Boron Concentration                  |

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|                       |  |                          |
|-----------------------|--|--------------------------|
| Action 3.4.5.C        | RCS Loops - MODE 3                             | NUREG(s)- 1430 1432 Only |
| Action 3.4.5.C Bases  | RCS Loops - MODE 3                             | NUREG(s)- 1430 1432 Only |
| Action 3.9.2.A        | Nuclear Instrumentation                        | NUREG(s)- 1430 1432 Only |
| Action 3.9.2.A Bases  | Nuclear Instrumentation                        | NUREG(s)- 1430 1432 Only |
| Action 3.9.2.B Bases  | Nuclear Instrumentation                        | NUREG(s)- 1430 1432 Only |
| Action 3.3.9.B        | Source Range Neutron Flux                      | NUREG(s)- 1430 Only      |
| Action 3.3.9.B Bases  | Source Range Neutron Flux                      | NUREG(s)- 1430 Only      |
| Action 3.3.10.B       | Intermediate Range Neutron Flux                | NUREG(s)- 1430 Only      |
| Action 3.3.10.B Bases | Intermediate Range Neutron Flux                | NUREG(s)- 1430 Only      |
| LCO 3.9.4             | DHR and Coolant Circulation - High Water Level | NUREG(s)- 1430 Only      |
| LCO 3.9.4 Bases       | DHR and Coolant Circulation - High Water Level | NUREG(s)- 1430 Only      |
| Action 3.9.4.A        | DHR and Coolant Circulation - High Water Level | NUREG(s)- 1430 Only      |
| Action 3.9.4.A Bases  | DHR and Coolant Circulation - High Water Level | NUREG(s)- 1430 Only      |
| Action 3.9.5.B        | DHR and Coolant Circulation - Low Water Level  | NUREG(s)- 1430 Only      |
| Action 3.9.5.B Bases  | DHR and Coolant Circulation - Low Water Level  | NUREG(s)- 1430 Only      |
| Action 3.3.1.G        | RTS Instrumentation                            | NUREG(s)- 1431 Only      |
| Action 3.3.1.G Bases  | RTS Instrumentation                            | NUREG(s)- 1431 Only      |
| Action 3.3.1.I        | RTS Instrumentation                            | NUREG(s)- 1431 Only      |
| Action 3.3.1.I Bases  | RTS Instrumentation                            | NUREG(s)- 1431 Only      |
| Action 3.3.1.L        | RTS Instrumentation                            | NUREG(s)- 1431 Only      |
| Action 3.3.1.L Bases  | RTS Instrumentation                            | NUREG(s)- 1431 Only      |
| Action 3.3.9.B        | BDPS   | NUREG(s)- 1431 Only      |
| Action 3.3.9.B Bases  | BDPS   | NUREG(s)- 1431 Only      |
| Action 3.4.5.D        | RCS Loops - MODE3                              | NUREG(s)- 1431 Only      |
| Action 3.4.5.D Bases  | RCS Loops - MODE3                              | NUREG(s)- 1431 Only      |
| Bkgnd 3.4.18 Bases    | RCS Isolated Loop Startup                      | NUREG(s)- 1431 Only      |
| LCO 3.4.18            | RCS Isolated Loop Startup                      | NUREG(s)- 1431 Only      |

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|                       |   |                     |
|-----------------------|---|---------------------|
| SR 3.4.18.2           | RCS Isolated Loop Startup                         | NUREG(s)- 1431 Only |
| SR 3.4.18.2 Bases     | RCS Isolated Loop Startup                         | NUREG(s)- 1431 Only |
| Action 3.9.3.A        | Nuclear Instrumentation                           | NUREG(s)- 1431 Only |
| Action 3.9.3.A Bases  | Nuclear Instrumentation                           | NUREG(s)- 1431 Only |
| Action 3.9.3.B Bases  | Nuclear Instrumentation                           | NUREG(s)- 1431 Only |
| LCO 3.9.5             | RHR and Coolant Circulation - High Water Level    | NUREG(s)- 1431 Only |
| LCO 3.9.5 Bases       | RHR and Coolant Circulation - High Water Level    | NUREG(s)- 1431 Only |
| Action 3.9.5.A        | RHR and Coolant Circulation - High Water Level    | NUREG(s)- 1431 Only |
| Action 3.9.5.A Bases  | RHR and Coolant Circulation - High Water Level    | NUREG(s)- 1431 Only |
| Action 3.9.6.B        | RHR and Coolant Circulation - Low Water Level     | NUREG(s)- 1431 Only |
| Action 3.9.6.B Bases  | RHR and Coolant Circulation - Low Water Level     | NUREG(s)- 1431 Only |
| Action 3.3.8.A Bases  | CRIS (Analog)                                     | NUREG(s)- 1432 Only |
| Action 3.3.8.C        | CRIS (Analog)                                     | NUREG(s)- 1432 Only |
| Action 3.3.9.A Bases  | CRIS (Digital)                                    | NUREG(s)- 1432 Only |
| Action 3.3.9.C        | CRIS (Digital)                                    | NUREG(s)- 1432 Only |
| Action 3.3.13.A       | [Logarithmic] Power Monitoring Channels (Analog)  | NUREG(s)- 1432 Only |
| Action 3.3.13.A       | [Logarithmic] Power Monitoring Channels (Digital) | NUREG(s)- 1432 Only |
| Action 3.3.13.A Bases | [Logarithmic] Power Monitoring Channels (Analog)  | NUREG(s)- 1432 Only |
| Action 3.3.13.A Bases | [Logarithmic] Power Monitoring Channels (Digital) | NUREG(s)- 1432 Only |
| LCO 3.9.4             | SDC and Coolant Circulation - High Water Level    | NUREG(s)- 1432 Only |
| LCO 3.9.4 Bases       | SDC and Coolant Circulation - High Water Level    | NUREG(s)- 1432 Only |
| Action 3.9.4.A        | SDC and Coolant Circulation - High Water Level    | NUREG(s)- 1432 Only |
| Action 3.9.4.A Bases  | SDC and Coolant Circulation - High Water Level    | NUREG(s)- 1432 Only |
| Action 3.9.5.B        | SDC and Coolant Circulation - Low Water Level     | NUREG(s)- 1432 Only |
| Action 3.9.5.B Bases  | SDC and Coolant Circulation - Low Water Level     | NUREG(s)- 1432 Only |

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INSERT 1

----- NOTE -----

Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM.

-----

INSERT 2

----- NOTE -----

Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SDM.

-----

INSERT 3

Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.

INSERT 4

Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of LCO 3.9.1.

INSERT 5

No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

INSERT 6

required to meet the SDM of LCO 3.1.1 or boron concentration of LCO 3.9.1

INSERT 7

less than that required to meet the minimum required boron concentration of LCO 3.9.1

INSERT 8

Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

INSERT B1

Required Action [ ] is modified by a note to indicate that normal plant control operations that individually add limited positive reactivity (e.g., temperature or boron fluctuations associated with RCS inventory management or temperature control) are not precluded by this Action, provided they are accounted for in the calculated SDM.

INSERT B2

Required Action [ ] is modified by a note which permits plant temperature changes provided the temperature change is accounted for in the calculated SDM. Introduction of temperature changes, including temperature increases when a positive MTC exists, must be evaluated to ensure they do not result in a loss of required SDM.

INSERT B4

Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations.

INSERT B5

introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1

INSERT B6

that could result in loss of required SDM (Mode 5) or boron concentration (Mode 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

INSERT B7

that could result in loss of required SDM (Mode 5) or boron concentration (Mode 6)

INSERT B8

Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

INSERT B9

introduction of coolant into the RCS with boron concentration less than required to meet the minimum boron concentration of LCO 3.9.1

INSERT B10

with coolant at boron concentrations less than required to assure the RCS boron concentration is maintained

INSERT B11

Suspending positive reactivity additions that could result in failure to meet the minimum boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that what would be required in the RCS for minimum refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation.

INSERT B12

Operations that individually add limited positive reactivity (e.g. temperature fluctuations from inventory addition or temperature control fluctuations), but when combined with all other operations affecting core reactivity (e.g., intentional boration) result in overall net negative reactivity addition, are not precluded by this action.

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3.3 INSTRUMENTATION

3.3.9 Source Range Neutron Flux

LCO 3.3.9 Two source range neutron flux channels shall be OPERABLE.

-----NOTE-----  
High voltage to detector may be de-energized above 1E-10 amp on intermediate range channels.  
-----

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

ACTIONS

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME                   |
|---|---|-----------------------------------|
| A. One source range neutron flux channel inoperable with THERMAL POWER level $\leq 1E-10$ amp on the intermediate range neutron flux channels.  | A.1 Restore channel to OPERABLE status.                       | Prior to increasing THERMAL POWER |
| B. Two source range neutron flux channels inoperable with THERMAL POWER level $\leq 1E-10$ amp on the intermediate range neutron flux channels. | B.1 Suspend operations involving positive reactivity changes. | Immediately                       |
|   | <u>AND</u>  |                                   |
|   | B.2 Initiate action to insert all CONTROL RODS.               | Immediately                       |
|   | <u>AND</u>  |                                   |
|   | B.3 Open CONTROL ROD drive trip breakers.                     | 1 hour                            |
|   | <u>AND</u>  |                                   |
|   |   | (continued)                       |

Insert 2



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3.3 INSTRUMENTATION

3.3.10 Intermediate Range Neutron Flux

LCO 3.3.10 Two intermediate range neutron flux channels shall be OPERABLE.

APPLICABILITY: MODE 2,  
When any CONTROL ROD drive (CRD) trip breaker is in the closed position and the CRD System is capable of rod withdrawal.

ACTIONS

| CONDITION                   | REQUIRED ACTION   | COMPLETION TIME |
|-----------------------------|---|-----------------|
| A. One channel inoperable.  | A.1 Reduce THERMAL POWER to < 1E-10 amp.                      | 2 hours         |
| B. Two channels inoperable. | B.1 Suspend operations involving positive reactivity changes. | Immediately     |
|                             | <u>AND</u><br>B.2 Open CRD trip breakers.                     |                 |

Insert 2

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE                       | FREQUENCY |
|------------------------------------|-----------|
| SR 3.3.10.1 Perform CHANNEL CHECK. | 12 hours  |

(continued)

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.5 RCS Loops—MODE 3

LCO 3.4.5 Two RCS loops shall be OPERABLE and at least one RCS loop shall be in operation.

-----NOTE-----

All reactor coolant pumps (RCPs) may be de-energized for  $\leq 8$  hours per 24 hour period for the transition to or from the Decay Heat Removal System, and all RCPs may be de-energized for  $\leq 1$  hour per 8 hour period for any other reason, provided:

- Insert 5* →
- a. ~~No operations are permitted that would cause reduction of the RCS boren concentration; and~~
  - b. Core outlet temperature is maintained at least [10]°F below saturation temperature.
- 

APPLICABILITY: MODE 3.

ACTIONS

| CONDITION   | REQUIRED ACTION                                   | COMPLETION TIME |
|---|---|-----------------|
| A. One required RCS loop inoperable.                                      | A.1 Restore required RCS loop to OPERABLE status. | 72 hours        |
| B. Required Action and associated Completion Time of Condition A not met. | B.1 Be in MODE 4.                                 | 12 hours        |

(continued)

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## ACTIONS (continued)

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME                |
|---|--|--------------------------------|
| C. No RCS loop OPERABLE.<br>OR<br>No RCS loop in operation. | C.1 <del>Suspend all operations involving a reduction of RCS boron concentration.</del><br><u>INSERT 3</u><br>AND<br>C.2 Initiate action to restore one RCS loop to OPERABLE status and operation. | Immediately<br><br>Immediately |

## SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY |
|--|-----------|
| SR 3.4.5.1 Verify required RCS loop is in operation.   | 12 hours  |
| SR 3.4.5.2 Verify correct breaker alignment and indicated power available to the required pump that is not in operation. | 7 days    |

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops—MODE 4

LCO 3.4.6 Two loops consisting of any combination of RCS loops and decay heat removal (DHR) loops shall be OPERABLE and at least one loop shall be in operation.

-----NOTE-----

All reactor coolant pumps (RCPs) may be de-energized for  $\leq 8$  hours per 24 hour period for the transition to or from the DHR System, and all RCPs and DHR pumps may be de-energized for  $\leq 1$  hour per 8 hour period for any other reason, provided:

Insert 5

- a. ~~No operations are permitted that would cause reduction of the RCS boron concentration; and~~
  - b. Core outlet temperature is maintained at least 10°F below saturation temperature.
- 

APPLICABILITY: MODE 4.

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| A. One required RCS loop inoperable.<br><br><u>AND</u><br><br>Two DHR loops inoperable. | A.1 Initiate action to restore a second loop to OPERABLE status. | Immediately     |

(continued)

TSTF-286, RWZ

**ACTIONS (continued)**

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME |
|---|---|-----------------|
| B. One required DHR loop inoperable.<br><br><u>AND</u><br><br>Two required RCS loops inoperable.  | B.1 Initiate action to restore a second loop to OPERABLE status.                            | Immediately     |
|   | <u>OR</u><br><br>B.2 Be in MODE 5.  | 24 hours        |
| C. Required RCS or DHR loops inoperable.<br><br><u>OR</u><br><br>No RCS or DHR loop in operation. | C.1 <del>Suspend all operations involving a reduction in RCS boron concentration.</del>     | Immediately     |
|   | <u>AND</u><br><br>C.2 Initiate action to restore one loop to OPERABLE status and operation. | Immediately     |

~~Suspend all operations involving a reduction in RCS boron concentration.~~

INSERT 3

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY |
|--|-----------|
| SR 3.4.6.1 Verify one DHR or RCS loop is in operation.   | 12 hours  |
| SR 3.4.6.2 Verify correct breaker alignment and indicated power available to the required pump that is not in operation. | 7 days    |

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops—MODE 5, Loops Filled

LCO 3.4.7 One decay heat removal (DHR) loop shall be OPERABLE and in operation, and either:

- a. One additional DHR loop shall be OPERABLE; or
- b. The secondary side water level of each steam generator (SG) shall be  $\geq$  [50]%.  
-----

NOTES

1. The DHR pump of the loop in operation may be de-energized for  $\leq$  1 hour per 8 hour period provided:

- a. ~~No operations are permitted that would cause reduction of the RCS boron concentration, and~~
- b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. One required DHR loop may be inoperable for up to 2 hours for surveillance testing provided that the other DHR loop is OPERABLE and in operation.
  3. All DHR loops may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.
- 

APPLICABILITY: MODE 5 with RCS loops filled.

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**ACTIONS**

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME |
|---|---|-----------------|
| <p>A. One DHR loop inoperable.</p> <p><u>AND</u></p> <p>Any SG with secondary side water level not within limits.</p> | <p>A.1 Initiate action to restore a second DHR loop to OPERABLE status.</p>   | Immediately     |
|   | <p><u>OR</u></p> <p>A.2 Initiate action to restore SG secondary side water levels to within limits.</p>   | Immediately     |
| <p>B. Required DHR loop inoperable.</p> <p><u>OR</u></p> <p>No DHR loop in operation.</p>                             | <p>B.1 <span style="border: 1px solid black; padding: 2px;">Suspend all operations involving a reduction in RCS boron concentration.</span></p> | Immediately     |
|   | <p><u>AND</u></p> <p>B.2 Initiate action to restore one DHR loop to OPERABLE status and operation.</p>  | Immediately     |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY |
|---|-----------|
| SR 3.4.7.1 Verify one DHR loop is in operation.                                     | 12 hours  |
| SR 3.4.7.2 Verify required SG secondary side water levels are $\geq$ [50]%.<br>[50] | 12 hours  |

(continued)

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 RCS Loops—MODE 5, Loops Not Filled

LCO 3.4.8 Two decay heat removal (DHR) loops shall be OPERABLE and one DHR loop shall be in operation.

-----NOTES-----

1. All DHR pumps may be de-energized for  $\leq 15$  minutes when switching from one loop to another provided:
  - [a. The maximum RCS temperature is  $\leq [160]^{\circ}\text{F};$
  - b. ~~No operations are permitted that would cause a reduction of the RCS boron concentration; and~~
  - c. No draining operations to further reduce the RCS water volume are permitted.
2. One DHR loop may be inoperable for  $\leq 2$  hours for surveillance testing provided that the other DHR loop is OPERABLE and in operation.

Insert 5.

APPLICABILITY: MODE 5 with RCS loops not filled.

ACTIONS

| CONDITION                   | REQUIRED ACTION   | COMPLETION TIME |
|-----------------------------|---|-----------------|
| A. One DHR loop inoperable. | A.1 Initiate action to restore DHR loop to OPERABLE status. | Immediately     |

(continued)





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**ACTIONS**

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME  |
|--|--|--|
| <p>A. One required offsite circuit inoperable.</p> | <p>-----NOTE-----<br/>Enter applicable Conditions and Required Actions of LCO 3.8.10, with one required train de-energized as a result of Condition A.<br/>-----</p> <p>A.1 Declare affected required feature(s) with no offsite power available inoperable.</p> <p><u>OR</u></p> <p>A.2.1 Suspend CORE ALTERATIONS.</p> <p><u>AND</u></p> <p>A.2.2 Suspend movement of irradiated fuel assemblies.</p> <p><u>AND</u></p> <p>A.2.3 <del>Initiate action to suspend operations involving positive reactivity additions.</del></p> <p><u>AND</u> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">INSERT 8</span></p> <p>A.2.4 Initiate action to restore required offsite power circuit to OPERABLE status.</p> | <p>Immediately</p> <p>Immediately</p> <p>Immediately</p> <p>Immediately</p> <p>Immediately</p> |

(continued)

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**ACTIONS (continued)**

| CONDITION                             | REQUIRED ACTION  | COMPLETION TIME    |
|---------------------------------------|--|--------------------|
| <p>B. One required DG inoperable.</p> | <p>B.1 Suspend CORE ALTERATIONS.</p>   | <p>Immediately</p> |
|                                       | <p><u>AND</u></p>  |                    |
|                                       | <p>B.2 Suspend movement of irradiated fuel assemblies.</p>   | <p>Immediately</p> |
|                                       | <p><u>AND</u></p>  |                    |
|                                       | <p>B.3 <del>Initiate action to suspend operations involving positive reactivity additions.</del></p> | <p>Immediately</p> |
|                                       | <p><u>AND</u></p>  |                    |
|                                       | <p>B.4 Initiate action to restore required DG to OPERABLE status.</p>                                | <p>Immediately</p> |

INSERT 8

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3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

LCO 3.8.5 DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME    |
|--|--|--------------------|
| <p>A. One or more required DC electrical power subsystems inoperable.</p>                              | <p>A.1 Declare affected required feature(s) inoperable.</p>  | <p>Immediately</p> |
|  | <p><u>OR</u></p>   |                    |
|  | <p>A.2.1 Suspend CORE ALTERATIONS.</p>                       | <p>Immediately</p> |
|  | <p><u>AND</u></p>  |                    |
|  | <p>A.2.2 Suspend movement of irradiated fuel assemblies.</p> | <p>Immediately</p> |
| <p><u>AND</u></p>  |  |                    |
| <p>A.2.3 <del>Initiate action to suspend operations involving positive reactivity additions.</del></p> | <p>Immediately</p>   |                    |
| <p><u>AND</u></p>  | <p><u>INSERT 8</u></p>                                       |                    |
| <p>(continued)</p>   |  |                    |

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3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters—Shutdown

LCO 3.8.8 Inverters shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION                                       | REQUIRED ACTION   | COMPLETION TIME |
|---|---|-----------------|
| A. One or more [required] inverters inoperable. | A.1 Declare affected required feature(s) inoperable.  | Immediately     |
|   | <u>OR</u>   |                 |
|   | A.2.1 Suspend CORE ALTERATIONS.   | Immediately     |
|   | <u>AND</u>  |                 |
|   | A.2.2 Suspend movement of irradiated fuel assemblies.   | Immediately     |
|   | <u>AND</u>  |                 |
|   | A.2.3 <del>Initiate action to suspend operations involving positive reactivity additions.</del> | Immediately     |
|   | <u>AND</u> <u>INSERT B</u>  |                 |
|   |   | (continued)     |

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3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems—Shutdown

LCO 3.8.10 The necessary portion of AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME |
|--|--|-----------------|
| A. One or more required AC, DC, or AC vital bus electrical power distribution subsystems inoperable. | A.1 Declare associated supported required feature(s) inoperable.   | Immediately     |
|  | <u>OR</u>  |                 |
|  | A.2.1 Suspend CORE ALTERATIONS.  | Immediately     |
|  | <u>AND</u>   |                 |
|  | A.2.2 Suspend movement of irradiated fuel assemblies.  | Immediately     |
|  | <u>AND</u>   |                 |
|  | A.2.3 <span style="border: 1px solid black; padding: 2px;">Initiate action to suspend operations involving positive reactivity additions.</span> | Immediately     |
|  | <u>AND</u> <span style="border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block;">INSERT 0</span>                       |                 |
|  |  | (continued)     |

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3.9 REFUELING OPERATIONS

3.9.2 Nuclear Instrumentation

LCO 3.9.2 Two source range neutron flux monitors shall be OPERABLE.

APPLICABILITY: MODE 6.

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME                                |
|--|--|--|
| A. One [required] source range neutron flux monitor inoperable.  | A.1 Suspend CORE ALTERATIONS.  | Immediately                                    |
|  | AND<br>A.2 <del>Suspend positive reactivity additions.</del>                             | Immediately                                    |
| B. Two [required] source range neutron flux monitors inoperable. | B.1 Initiate action to restore one source range neutron flux monitor to OPERABLE status. | Immediately                                    |
|  | AND<br>B.2 Perform SR 3.9.1.1.   | 4 hours<br>AND<br>Once per 12 hours thereafter |

DHR and Coolant Circulation—High Water Level  
3.9.4

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3.9 REFUELING OPERATIONS

3.9.4 Decay Heat Removal (DHR) and Coolant Circulation—High Water Level

LCO 3.9.4 One DHR loop shall be OPERABLE and in operation.

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

, coolant with

Insert 7

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

ACTIONS

| CONDITION                         | REQUIRED ACTION   | COMPLETION TIME |
|-----------------------------------|---|-----------------|
| A. DHR loop requirements not met. | A.1 <del>Suspend operations involving a reduction in reactor coolant boron concentration.</del> | Immediately     |
|                                   | <u>AND</u>  |                 |
|                                   | A.2 Suspend loading irradiated fuel assemblies in the core.                                     | Immediately     |
|                                   | <u>AND</u>  |                 |
|                                   | A.3 Initiate action to satisfy DHR loop requirements.   | Immediately     |
|                                   | <u>AND</u>  |                 |
|                                   |   | (continued)     |



DHR and Coolant Circulation—Low Water Level  
3.9.5

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3.9 REFUELING OPERATIONS

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

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

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

ACTIONS

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

INSERT 4

BASES

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ACTIONS

A.1 (continued)

instrumentation is to delay increasing reactor power until the channel is repaired and restored to OPERABLE status. This limits power increases in the range where the operators rely solely on the source range instrumentation for power indication. The Completion Time ensures the source range is available prior to further power increases. Furthermore, it ensures that power remains below the point where the intermediate range channels provide primary protection until both source range channels are available to support the overlap verification required by SR 3.3.9.4.

B.1, B.2, B.3, and B.4

With both source range neutron flux channels inoperable with THERMAL POWER  $\leq 1E-10$  amp on the intermediate range neutron flux instrumentation, the operators must place the reactor in the next lowest condition for which source range instrumentation is not required. This is done by immediately suspending positive reactivity additions, initiating action to insert all CONTROL RODS, and opening the CONTROL ROD drive trip breakers within 1 hour. Periodic SDM verification of  $\geq 1\% \Delta k/k$  is then required to provide a means for detecting the slow reactivity changes that could be caused by mechanisms other than control rod withdrawal or operations involving positive reactivity changes. Since the source range instrumentation provides the only reliable direct indication of power in this condition, the operators must continue to verify the SDM every 12 hours until at least one channel of the source range instrumentation is returned to OPERABLE status. Required Action B.1, Required Action B.2, and Required Action B.3 preclude rapid positive reactivity additions. The 1 hour Completion Time for Required Action B.3 and Required Action B.4 provides sufficient time for operators to accomplish the actions. The 12 hour Frequency for performing the SDM verification ensures that the reactivity changes possible with CONTROL RODS inserted are detected before SDM limits are challenged.

Insert B2

C.1

With reactor power  $> 1E-10$  amp in MODE 2, 3, 4, or 5 on the intermediate range neutron flux instrumentation, continued

(continued)

BASES

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ACTIONS

B.1 and B.2 (continued)

reactor in the next lowest condition for which the intermediate range instrumentation is not required. This involves providing power level indication on the source range instrumentation by immediately suspending operations involving positive reactivity changes and, within 1 hour, placing the reactor in the tripped condition with the CRD trip breakers open. The Completion Times are based on unit operating experience and allow the operators sufficient time to manually insert the CONTROL RODS prior to opening the CRD breakers.

Insert B2

SURVEILLANCE  
REQUIREMENTS

SR 3.3.10.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; therefore, it is key in verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the transmitter or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

The Frequency, about once every shift, is based on operating experience that demonstrates channel failure is rare. Since the probability of two random failures in redundant channels in any 12 hour period is extremely low, the CHANNEL CHECK minimizes the chance of loss of protective function due to

(continued)

TSTF-286, Bu. 2

BASES

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APPLICABLE  
SAFETY ANALYSES  
(continued)

RCS Loops—MODE 3 satisfy Criterion 3 of the NRC Policy Statement.

---

LCO

The purpose of this LCO is to require two loops to be available for heat removal thus providing redundancy. The LCO requires the two loops to be OPERABLE with the intent of requiring both SGs to be capable of transferring heat from the reactor coolant at a controlled rate. Forced reactor coolant flow is the required way to transport heat, although natural circulation flow provides adequate removal. A minimum of one running RCP meets the LCO requirement for one loop in operation.

The Note permits a limited period of operation without RCPs. All RCPs may be de-energized for  $\leq 8$  hours per 24 hour period for the transition to or from the Decay Heat Removal (DHR) System, and otherwise may be de-energized for  $\leq 1$  hour per 8 hour period. This means that natural circulation has been established. When in natural circulation, boron reduction is prohibited because an even concentration distribution throughout the RCS cannot be ensured. Core outlet temperature is to be maintained at least  $[10]^{\circ}\text{F}$  below the saturation temperature so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

With coolant at boron concentrations less than required to assure the SOM of LCO 3.1.1,

In MODES 3, 4, and 5, it is sometimes necessary to stop all RCP or DHR pump forced circulation (e.g., change operation from one DHR train to the other, to perform surveillance or startup testing, to perform the transition to and from DHR System cooling, or to avoid operation below the RCP minimum net positive suction head limit). The time period is acceptable because natural circulation is adequate for heat removal, or the reactor coolant temperature can be maintained subcooled and boron stratification affecting reactivity control is not expected.

An OPERABLE RCS loop consists of at least one OPERABLE RCP and an SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program. An RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required.

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(continued)

BASES (continued)

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APPLICABILITY

In MODE 3, the heat load is lower than at power; therefore, one RCS loop in operation is adequate for transport and heat removal. A second RCS loop is required to be OPERABLE but not in operation for redundant heat removal capability.

Operation in other MODES is covered by:

- LCO 3.4.4, "RCS Loops—MODES 1 and 2";
  - LCO 3.4.6, "RCS Loops—MODE 4";
  - LCO 3.4.7, "RCS Loops—MODE 5, Loops Filled";
  - LCO 3.4.8, "RCS Loops—MODE 5, Loops Not Filled";
  - LCO 3.9.4, "Decay Heat Removal (DHR) and Coolant Circulation—High Water Level" (MODE 6); and
  - LCO 3.9.5, "Decay Heat Removal (DHR) and Coolant Circulation—Low Water Level" (MODE 6).
- 

ACTIONS

A.1

If one required RCS loop is inoperable, redundancy for forced flow heat removal is lost. The Required Action is restoration of the required RCS loop to OPERABLE status within a Completion Time of 72 hours. This time allowance is a justified period to be without the redundant nonoperating loop because a single loop in operation has a heat transfer capability greater than that needed to remove the decay heat produced in the reactor core.

B.1

If restoration is not possible within 72 hours, the unit must be brought to MODE 4. In MODE 4, the plant may be placed on the DHR System. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to achieve cooldown and depressurization from the existing plant conditions and without challenging plant systems.

C.1 and C.2

Insert B5

If no RCS loop is OPERABLE or in operation, except as provided in the Note in the LCO section, all operations involving a reduction of RCS boron concentration must be immediately suspended. This is necessary because boron

(continued)

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BASES

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ACTIONS

C.1 and C.2 (continued)

~~Dilution requires forced circulation for proper homogenization.~~ Action to restore one RCS loop to operation shall be immediately initiated and continued until one RCS loop is restored to operation and to OPERABLE status. The immediate Completion Time reflects the importance of maintaining operation for decay heat removal.

INSERT  
BY

SURVEILLANCE  
REQUIREMENTS

SR 3.4.5.1

This SR requires verification every 12 hours that the required number of loops and pumps is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess RCS loop status. In addition, control room indication and alarms will normally indicate loop status.

SR 3.4.5.2

Verification that the required number of RCPs are OPERABLE ensures that the single failure criterion is met and that an additional RCS loop can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power availability to the required pump that is not in operation. The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.

REFERENCES

None.

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BASES

LCO  
(continued)

with coolant  
at boron  
concentrations  
less than required  
to assure the  
ISAM of LCO  
3.1.1 is  
maintained

established using the SGs. The Note prohibits boron dilution when forced flow is stopped because an even concentration distribution cannot be ensured. Core outlet temperature is to be maintained at least 10°F below saturation temperature so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

The Note also permits the DHR pumps to be stopped for ≤ 1 hour per 8 hour period. When the DHR pumps are stopped, no alternate heat removal path exists, unless the RCS and SGs have been placed in service in forced or natural circulation. The response of the RCS without the DHR System depends on the core decay heat load and the length of time that the DHR pumps are stopped. As decay heat diminishes, the effects on RCS temperature and pressure diminish. Without cooling by DHR, higher heat loads will cause the reactor coolant temperature and pressure to increase at a rate proportional to the decay heat load. Because pressure can increase, the applicable system pressure limits (pressure and temperature (P/T) or low temperature overpressure protection (LTOP) limits) must be observed and forced DHR flow or heat removal via the SGs must be re-established prior to reaching the pressure limit. The circumstances for stopping both DHR trains are to be limited to situations where:

- a. Pressure and pressure and temperature increases can be maintained well within the allowable pressure (P/T and LTOP) and 10°F subcooling limits; or
- b. An alternate heat removal path through the SG is in operation.

An OPERABLE RCS loop consists of at least one OPERABLE RCP and an SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program.

Similarly for the DHR System, an OPERABLE DHR loop is comprised of the OPERABLE DHR pump(s) capable of providing forced flow to the DHR heat exchanger(s). DHR pumps are OPERABLE if they are capable of being powered and are able to provide flow if required.

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

operating experience, to reach MODE 5 in an orderly manner and without challenging plant systems.

C.1 and C.2

If no RCS or DHR loops are OPERABLE or in operation, except during conditions permitted by the Note in the LCO section, all operations involving ~~a reduction of RCS boron concentration~~ must be suspended and action to restore one RCS or DHR loop to OPERABLE status and operation must be initiated. ~~Boron dilution requires forced circulation for proper mixing, and the margin to criticality must not be reduced in this type of operation.~~ The immediate Completion Times reflect the importance of maintaining operation for decay heat removal. The action to restore must continue until one loop is restored to operation.

Insert B5

required

INSERT B4

SURVEILLANCE REQUIREMENTS

SR 3.4.6.1

This Surveillance requires verification every 12 hours of the required number of DHR or RCS loops in operation to ensure forced flow is providing decay heat removal. Verification includes flow rate, temperature, or pump status monitoring. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess RCS loop status. In addition, control room indication and alarms will normally indicate loop status.

SR 3.4.6.2

Verification that the required pump is OPERABLE ensures that an additional RCS or DHR loop can be placed in operation if needed to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to the required pumps. The Frequency of 7 days is considered reasonable in view of other administrative controls and has been shown to be acceptable by operating experience.

(continued)



BASES

TSTF-286, Rev 2

BACKGROUND  
(continued)

removal path, the option to increase RCS pressure and temperature for heat removal in MODE 4 is provided.

APPLICABLE  
SAFETY ANALYSES

No safety analyses are performed with initial conditions in MODE 5.

RCS Loops—MODE 5 (Loops Filled) have been identified in the NRC Policy Statement as important contributors to risk reduction.

LCO

The purpose of this LCO is to require that at least one of the DHR loops be OPERABLE and in operation with an additional DHR loop OPERABLE or both SGs with secondary side water level  $\geq$  [50]%. One DHR loop provides sufficient forced circulation to perform the safety functions of the reactor coolant under these conditions. The second DHR loop is normally maintained as a backup to the operating DHR loop to provide redundancy for decay heat removal. However, if the standby DHR loop is not OPERABLE, a sufficient alternate method of providing redundant heat removal paths is to provide both SGs with their secondary side water levels  $\geq$  [50]%. Should the operating DHR loop fail, the SGs could be used to remove the decay heat.

Note 1 permits the DHR pumps to be stopped for up to 1 hour per 8 hour period. The circumstances for stopping both DHR trains are to be limited to situations where: (a) Pressure and temperature increases can be maintained well within the allowable pressure (P/T and low temperature overpressure protection) and 10°F subcooling limits; or (b) Alternate heat paths through the SGs are in operation.

With coolant at boron concentrations less than required to assure the sam of LCO 3.1.1 is maintained

The Note prohibits boron dilution when DHR forced flow is stopped because an even concentration distribution cannot be ensured. Core outlet temperature is to be maintained at least 10°F below saturation temperature so that no vapor bubble would form and possibly cause a natural circulation flow obstruction. In this MODE, the generators are used as a backup for decay heat removal and, to ensure their availability, the RCS loop flow path is to be maintained with subcooled liquid.

(continued)

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BASES

APPLICABILITY  
(continued)

LCO 3.9.4, "Decay Heat Removal (DHR) and Coolant Circulation—High Water Level" (MODE 6); and  
LCO 3.9.5, "Decay Heat Removal (DHR) and Coolant Circulation—Low Water Level" (MODE 6).

ACTIONS

A.1 and A.2

If one DHR loop is inoperable and any SG has secondary side water level < [50]%, redundancy for heat removal is lost. Action must be initiated to restore a second DHR loop to OPERABLE status or initiate action to restore the secondary side water level in the SGs, and action must be taken immediately. Either Required Action A.1 or Required Action A.2 will restore redundant decay heat removal paths. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

B.1 and B.2

Insert B5

If no DHR loop is in operation, except as provided in Note 1, or no required DHR loop is OPERABLE, all operations involving the reduction of RCS boron concentration must be suspended and action to restore a DHR loop to OPERABLE status and operation must be initiated. Boron dilution requires forced circulation for proper mixing and the margin to criticality must not be reduced in this type of operation. The immediate Completion Time reflects the importance of maintaining operation for decay heat removal.

required

INSERT B4

SURVEILLANCE  
REQUIREMENTS

SR 3.4.7.1

This SR requires verification every 12 hours that the required DHR loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation. In addition, control room indication and alarms will normally indicate loop status.

(continued)

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BASES (continued)

LCO

The purpose of this LCO is to require that a minimum of two DHR loops be OPERABLE and that one of these loops be in operation. An OPERABLE loop is one that has the capability of transferring heat from the reactor coolant at a controlled rate. Heat cannot be removed via the DHR system unless forced flow is used. A minimum of one running decay heat removal pump meets the LCO requirement for one loop in operation. An additional DHR loop is required to be OPERABLE to provide redundancy for heat removal.

Note 1 permits the DHR pumps to be de-energized for  $\leq 15$  minutes when switching from one train to the other. The circumstances for stopping both DHR pumps are to be limited to situations where the outage time is short [and temperature is maintained  $\leq [160]^{\circ}\text{F}$ ]. The Note prohibits boron dilution or draining operations when DHR forced flow is stopped.

With coolant at boron concentrations less than required to assure the SOM of LCO (3.1.1) is maintained.

Note 2 allows one DHR loop to be inoperable for a period of 2 hours provided that the other loop is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable loop during the only time when these tests are safe and possible.

An OPERABLE DHR loop is composed of an OPERABLE DHR pump capable of providing forced flow to an OPERABLE DHR heat exchanger. DHR pumps are OPERABLE if they are capable of being powered and are able to provide flow if required.

APPLICABILITY

In MODE 5 with loops not filled, this LCO requires core heat removal and coolant circulation by the DHR System.

Operation in other MODES is covered by:

- LCO 3.4.4, "RCS Loops—MODES 1 and 2";
- LCO 3.4.5, "RCS Loops—MODE 3";
- LCO 3.4.6, "RCS Loops—MODE 4";
- LCO 3.4.7, "RCS Loops—MODE 5, Loops Filled";
- LCO 3.9.4, "Decay Heat Removal (DHR) and Coolant Circulation—High Water Level" (MODE 6); and
- LCO 3.9.5, "Decay Heat Removal (DHR) and Coolant Circulation—Low Water Level" (MODE 6).

(continued)

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BASES (continued)

ACTIONS

A.1

If only one DHR loop is OPERABLE, redundancy for heat removal is lost. Required Action A.1 is to immediately initiate activities to restore a second loop to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

B.1 and B.2

*Insert B5*

If both required loops are inoperable or the required loop is not in operation, except as provided by Note 1 in the LCO, the Required Action requires immediate suspension of all operations involving boron reduction and requires initiation of action to immediately restore one DHR loop to OPERABLE status and operation. The Required Action for restoration does not apply to the condition of both loops not in operation when the exception Note in the LCO is in force. The immediate Completion Time reflects the importance of maintaining operations for decay heat removal. The action to restore must continue until one loop is restored.

*INSECT B4*

SURVEILLANCE  
REQUIREMENTS

SR 3.4.8.1

This Surveillance requires verification every 12 hours that at least one loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions.

SR 3.4.8.2

Verification that the required number of pumps are OPERABLE ensures that redundancy for heat removal is provided. The requirement also ensures that additional loops can be placed in operation if needed to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to

(continued)

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BASES

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ACTIONS

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4  
(continued)

power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SDM is maintained.

INSERT B6

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

Pursuant to LCO 3.0.6, the Distribution System's ACTIONS are not entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A are modified by a Note to indicate that when Condition A is entered with no AC power to any required ESF bus, the ACTIONS for LCO 3.8.10 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit, whether or not a train is de-energized. LCO 3.8.10 provides the appropriate restrictions for the situation involving a de-energized train.

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.2.1

SR 3.8.2.1 requires the SRs from LCO 3.8.1 that are necessary for ensuring the OPERABILITY of the AC sources in other than MODES 1, 2, 3, and 4. SR 3.8.1.8 is not required

(continued)

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BASES

---

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained.

INSERT B6

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

---

SURVEILLANCE  
REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.8. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

(continued)

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BASES

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ACTIONS

A.1. A.2.1. A.2.2. A.2.3. and A.2.4 (continued)

Insert B6

~~additions. The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained. By the allowance of the option to declare required features inoperable with the associated inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).~~

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power or powered from a constant voltage source transformer.

---

SURVEILLANCE  
REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

(continued)

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BASES (continued)

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Insert B7

Although redundant required features may require redundant trains of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem train may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystems LCO's Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).

INSERT B10

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the unit safety systems.

Notwithstanding performance of the above conservative Required Actions, a required decay heat removal (DHR) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.5 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the DHR ACTIONS would not be entered. Therefore, Required Action A.2.6 is provided to direct declaring DHR inoperable, which results in taking the appropriate DHR actions.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power.

(continued)



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BASES

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LCO  
(continued)

Adequate mixing prevents stratification to ensure that dilution induced reactivity changes are gradual, as well as recognizable and controllable by the operator. Forced circulation will also ensure that the boron concentration determined by chemical analysis is representative of the entire coolant volume.

Violation of the LCO could lead to an inadvertent criticality during MODE 6.

---

APPLICABILITY

This LCO is applicable in MODE 6 to ensure that the fuel in the reactor vessel will remain subcritical. The required boron concentration ensures a  $k_{eff} \leq 0.95$ . Above MODE 6, LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," and LCO 3.1.2, "Reactivity Balance," ensure that an adequate amount of negative reactivity is available to shut down the reactor and to maintain it subcritical.

---

ACTIONS

A.1 and A.2

Continuation of CORE ALTERATIONS or positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the unit in compliance with the LCO. If the boron concentration of any coolant volume in the RCS, the refueling canal, or the refueling cavity is less than its limit, all operations involving CORE ALTERATIONS or positive reactivity additions must be suspended immediately.

Suspension of CORE ALTERATIONS and positive reactivity additions shall not preclude moving a component to a safe position.

A.3

In addition to immediately suspending CORE ALTERATIONS  positive reactivity additions, action to restore the concentration must be initiated immediately.

In determining the required combination of boration flow rate and concentration, there is no unique Design Basis

and

<EDIT>

INSERT E12

(continued)

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BASES (continued)

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LCO This LCO requires two source range neutron flux monitors OPERABLE to ensure that redundant monitoring capability is available to detect changes in core reactivity.

---

APPLICABILITY In MODE 6, the source range neutron flux monitors must be OPERABLE to determine changes in core reactivity. There is no other direct means available to check core reactivity levels. In MODES 2, 3, 4, and 5, these same installed source range detectors and circuitry are also required to be OPERABLE by LCO 3.3.9, "Source Range Neutron Flux."

---

ACTIONS

A.1 and A.2

With only one [required] source range neutron flux monitor OPERABLE, redundancy has been lost. Since these instruments are the only direct means of monitoring core reactivity conditions, CORE ALTERATIONS and ~~positive reactivity additions~~ must be suspended immediately. Performance of Required Action A.1 shall not preclude completion of movement of a component to a safe position.

Insert B9

Insert B11

B.1

With no [required] source range neutron flux monitor OPERABLE, action to restore a monitor to OPERABLE status shall be initiated immediately. Once initiated, action shall be continued until a source range neutron flux monitor is restored to OPERABLE status.

B.2

With no [required] source range neutron flux monitor OPERABLE, there is no direct means of detecting changes in core reactivity. However, since CORE ALTERATIONS and positive reactivity additions are not to be made, the core reactivity condition is stabilized until the source range neutron flux monitors are OPERABLE. This stabilized condition is determined by performing SR 3.9.1.1 to ensure that the required boron concentration exists.

(continued)

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BASES

APPLICABLE  
SAFETY ANALYSES  
(continued)

Although the DHR System does not meet a specific criterion of the NRC Policy Statement, it was identified in the NRC Policy Statement as an important contributor to risk reduction. Therefore, the DHR System is retained as a Specification.

LCO

Only one DHR loop is required for decay heat removal in MODE 6, with a water level  $\geq 23$  ft above the top of the reactor vessel flange. Only one DHR loop is required to be OPERABLE because the volume of water above the reactor vessel flange provides backup decay heat removal capability. At least one DHR loop must be OPERABLE and in operation to provide:

- a. Removal of decay heat;
- b. Mixing of borated coolant to minimize the possibility of criticality; and
- c. Indication of reactor coolant temperature.

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

Additionally, each DHR loop is considered OPERABLE if it can be manually aligned (remote or local) in the shutdown cooling mode for removal of decay heat. Operation of one subsystem can maintain the reactor coolant temperature as required.

5 are permitted

The LCO is modified by a Note that allows the required DHR loop to be removed from operation for up to 1 hour in an 8 hour period, provided no operation that would cause ~~reduction of~~ the RCS boron concentration ~~is in progress~~.

dilute

Insert B10

Boron concentration reduction is prohibited because uniform concentration distribution cannot be ensured without forced circulation. This permits operations such as core mapping or alterations in the vicinity of the reactor vessel hot leg nozzles and RCS to DHR isolation valve testing. During this 1 hour period, decay heat is removed by natural convection to the large mass of water in the refueling cavity.

Insert B9

(continued)

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BASES (continued)

**APPLICABILITY** One DHR loop must be OPERABLE and in operation in MODE 6, with the water level  $\geq$  23 ft above the top of the reactor vessel flange, to provide decay heat removal. The 23 ft water level was selected because it corresponds to the 23 ft requirement established for fuel movement in LCO 3.9.6, "Refueling Canal Water Level." Requirements for the DHR System in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS), and Section 3.5, Emergency Core Cooling Systems (ECCS). DHR loop requirements in MODE 6, with the water level  $<$  23 ft above the top of the reactor vessel flange, are located in LCO 3.9.5, "Decay Heat Removal (DHR) and Coolant Circulation—Low Water Level."

**ACTIONS** DHR loop requirements are met by having one DHR loop OPERABLE and in operation, except as permitted in the Note to the LCO.

A.1

If DHR loop requirements are not met, there will be no forced circulation to provide mixing to establish uniform boron concentrations. Reduced boron concentrations can occur by adding water with a lower boron concentration than that contained in the RCS. Therefore, actions that reduce boron concentration shall be suspended immediately.

INSERT B11

A.2

If DHR loop requirements are not met, actions shall be taken immediately to suspend the loading of irradiated fuel assemblies in the core. With no forced circulation cooling, decay heat removal from the core occurs by natural convection to the heat sink provided by the water above the core. A minimum refueling water level 23 ft above the reactor vessel flange provides an adequate available heat sink. Suspending any operation that would increase decay heat load, such as loading a fuel assembly, is prudent under this condition.

(continued)

TSTF - 286, Au 2

BASES

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ACTIONS

A.1 and A.2 (continued)

vessel flange, the Applicability will change to that of LCO 3.9.4, and only one DHR loop is required to be OPERABLE and in operation. An immediate Completion Time is necessary for an operator to initiate corrective actions to restore the required forced circulation or water level.

B.1

If no DHR loop is in operation or no DHR loop is OPERABLE, there will be no forced circulation to provide mixing to establish uniform boron concentrations.

INSERT B11

~~Reduced boron concentration can occur by adding water with a lower boron concentration than that contained in the RCS. Therefore, actions that reduce boron concentration shall be suspended immediately.~~

B.2

If no DHR loop is in operation or no DHR loop is OPERABLE, actions shall be initiated immediately and continued without interruption to restore one DHR loop to OPERABLE status and operation. Since the unit is in Conditions A and B concurrently, the restoration of two OPERABLE DHR loops and one operating DHR loop should be accomplished expeditiously.

If no DHR loop is OPERABLE or in operation, alternate actions shall have been initiated immediately under Condition A to establish  $\geq 23$  ft of water above the top of the reactor vessel flange. Furthermore, when the LCO cannot be fulfilled, alternate decay heat removal methods, as specified in the unit's Abnormal and Emergency Operating Procedures, should be implemented. This includes decay heat removal using the charging or safety injection pumps through the Chemical and Volume Control System with consideration for the boron concentration. The method used to remove decay heat should be the most prudent as well as the safest choice, based upon unit conditions. The choice could be different if the reactor vessel head is in place rather than removed.

(continued)

Insert 1

ACTIONS (continued)

| CONDITION  | REQUIRED ACTION   | COMPLETION TIME                                      |
|--|---|--|
| <p>G. THERMAL POWER &gt; P-6 and &lt; P-10, two Intermediate Range Neutron Flux channels inoperable.</p> | <p>G.1 Suspend operations involving positive reactivity additions.</p> <p><u>AND</u></p> <p>G.2 Reduce THERMAL POWER to &lt; P-6.</p> | <p>Immediately</p> <p>2 hours</p>                    |
| <p>H. THERMAL POWER &lt; P-6, one or two Intermediate Range Neutron Flux channels inoperable.</p>        | <p>H.1 Restore channel(s) to OPERABLE status.</p>   | <p>Prior to increasing THERMAL POWER to &gt; P-6</p> |
| <p>I. One Source Range Neutron Flux channel inoperable.</p>  | <p>I.1 Suspend operations involving positive reactivity additions.</p>  | <p>Immediately</p>                                   |
| <p>J. Two Source Range Neutron Flux channels inoperable.</p>   | <p>J.1 Open RTBs.</p>   | <p>Immediately</p>                                   |
| <p>K. One Source Range Neutron Flux channel inoperable.</p>  | <p>K.1 Restore channel to OPERABLE status.</p> <p><u>OR</u></p> <p>K.2 Open RTBs.</p>   | <p>48 hours</p> <p>49 hours</p>                      |

(continued)

## ACTIONS (continued)

Insert 2

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME  |
|--|--|--|
| L. Required Source Range Neutron Flux channel[(s)] inoperable. | <p>L.1 Suspend operations involving positive reactivity additions.</p> <p><u>AND</u></p> <p>L.2 Close unborated water source isolation valves.</p> <p><u>AND</u></p> <p>L.3 Perform SR 3.1.1.1.</p>                                      | <p>Immediately</p> <p>1 hour</p> <p>1 hour</p> <p><u>AND</u></p> <p>Once per 12 hours thereafter</p> |
| M. One channel inoperable.                                     | <p>-----NOTE-----<br/>The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.<br/>-----</p> <p>M.1 Place channel in trip.</p> <p><u>OR</u></p> <p>M.2 Reduce THERMAL POWER to &lt; P-7.</p> | <p>6 hours</p> <p>12 hours</p>   |

(continued)

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### 3.3 INSTRUMENTATION

#### 3.3.9 Boron Dilution Protection System (BDPS)

LCO 3.3.9 Two trains of the BDPS shall be OPERABLE.

APPLICABILITY: MODES [2,] 3, 4, and 5.

-----NOTE-----  
 The boron dilution flux doubling signal may be blocked in  
 MODES 2 and 3 during reactor startup.  
 -----

#### ACTIONS

| CONDITION  | REQUIRED ACTION   | COMPLETION TIME  |
|--|---|--|
| A. One train inoperable.   | A.1 Restore train to OPERABLE status.   | 72 hours   |
| B. Two trains inoperable.<br><br><u>OR</u><br><br>Required Action and associated Completion Time of Condition A not met. | B.1 Suspend operations involving positive reactivity additions.<br><br><u>AND</u><br><br>B.2.1 Restore one train to OPERABLE status.<br><br><u>OR</u><br><br>B.2.2.1 Close unborated water source isolation valves.<br><br><u>AND</u> | Immediately<br><br>1 hour<br><br>1 hour<br><br><br><br>(continued) |

INSERT 2



3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.5 RCS Loops—MODE 3

LCO 3.4.5 [Two] RCS loops shall be OPERABLE, and either:

- a. [Two] RCS loops shall be in operation when the Rod Control System is capable of rod withdrawal; or
- b. One RCS loop shall be in operation when the Rod Control System is not capable of rod withdrawal.

-----NOTE-----

All reactor coolant pumps may be de-energized for  $\leq 1$  hour per 8 hour period provided:

Insert 5

- a. ~~No operations are permitted that would cause reduction of the RCS boron concentration; and~~
- b. Core outlet temperature is maintained at least 10°F below saturation temperature.

APPLICABILITY: MODE 3.

ACTIONS

| CONDITION   | REQUIRED ACTION                                   | COMPLETION TIME |
|---|---|-----------------|
| A. One required RCS loop inoperable.                                      | A.1 Restore required RCS loop to OPERABLE status. | 72 hours        |
| B. Required Action and associated Completion Time of Condition A not met. | B.1 Be in MODE 4.                                 | 12 hours        |

(continued)

ACTIONS (continued)

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| C. One required RCS loop not in operation, and reactor trip breakers closed and Rod Control System capable of rod withdrawal. | C.1 Restore required RCS loop to operation.  | 1 hour          |
|   | OR<br>C.2 De-energize all control rod drive mechanisms (CRDMs).                                | 1 hour          |
| D. [Two] RCS loops inoperable.<br><br>OR<br>No RCS loop in operation.   | D.1 De-energize all CRDMs.   | Immediately     |
|   | AND<br>D.2 <del>Suspend all operations involving a reduction of RCS boron concentration.</del> | Immediately     |
|   | AND<br>D.3 Initiate action to restore one RCS loop to OPERABLE status and operation.           | Immediately     |

Insert 3

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY |
|--|-----------|
| SR 3.4.5.1 Verify required RCS loops are in operation. | 12 hours  |

(continued)

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops—MODE 4

LCO 3.4.6 Two loops consisting of any combination of RCS loops and residual heat removal (RHR) loops shall be OPERABLE, and one loop shall be in operation.

NOTES

1. All reactor coolant pumps (RCPs) and RHR pumps may be de-energized for  $\leq 1$  hour per 8 hour period provided:

Insert 5

a. ~~No operations are permitted that would cause reduction of the RCS boron concentration; and~~

b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. No RCP shall be started with any RCS cold leg temperature  $\leq [275]^{\circ}\text{F}$  unless the secondary side water temperature of each steam generator (SG) is  $\leq [50]^{\circ}\text{F}$  above each of the RCS cold leg temperatures.

APPLICABILITY: MODE 4.

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| A. One required RCS loop inoperable.<br><br><u>AND</u><br><br>Two RHR loops inoperable. | A.1 Initiate action to restore a second loop to OPERABLE status. | Immediately     |

(continued)

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**ACTIONS (continued)**

| CONDITION  | REQUIRED ACTION   | COMPLETION TIME                       |
|--|---|---------------------------------------|
| <p>B. One required RHR loop inoperable.</p> <p><u>AND</u></p> <p>Two required RCS loops inoperable.</p>  | <p>B.1 Be in MODE 5.</p> <p style="text-align: center;"><i>Insert 3</i></p>   | 24 hours                              |
| <p>C. Required RCS or RHR loops inoperable.</p> <p><u>OR</u></p> <p>No RCS or RHR loop in operation.</p> | <p>C.1 <del>Suspend all operations involving a reduction of RCS boron concentration.</del></p> <p><u>AND</u></p> <p>C.2 Initiate action to restore one loop to OPERABLE status and operation.</p> | <p>Immediately</p> <p>Immediately</p> |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY |
|---|-----------|
| SR 3.4.6.1 Verify one RHR or RCS loop is in operation.                                    | 12 hours  |
| SR 3.4.6.2 Verify SG secondary side water levels are $\geq$ [17]% for required RCS loops. | 12 hours  |

(continued)

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops—MODE 5, Loops Filled

LCO 3.4.7 One residual heat removal (RHR) loop shall be OPERABLE and in operation, and either:

- a. One additional RHR loop shall be OPERABLE; or
- b. The secondary side water level of at least [two] steam generators (SGs) shall be  $\geq$  [17]%.  
-----

-----NOTES-----

1. The RHR pump of the loop in operation may be de-energized for  $\leq$  1 hour per 8 hour period provided:

a. ~~No operations are permitted that would cause reduction of the RCS boron concentration; and~~

b. Core outlet temperature is maintained at least 10°F below saturation temperature.

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

3. No reactor coolant pump shall be started with one or more RCS cold leg temperatures  $\leq$  [275]°F unless the secondary side water temperature of each SG is  $\leq$  [50]°F above each of the RCS cold leg temperatures.

4. All RHR loops may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.  
-----

Insert 5

APPLICABILITY: MODE 5 with RCS loops filled.

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**ACTIONS**

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| <p>A. One RHR loop inoperable.</p> <p><u>AND</u></p> <p>Required SGs secondary side water levels not within limits.</p> | <p>A.1 Initiate action to restore a second RHR loop to OPERABLE status.</p>  | Immediately     |
|   | <p><u>OR</u></p> <p>A.2 Initiate action to restore required SG secondary side water levels to within limits.</p>   | Immediately     |
| <p>B. Required RHR loops inoperable.</p> <p><u>OR</u></p> <p>No RHR loop in operation.</p>                              | <p>B.1 <span style="border: 1px solid black; padding: 5px; display: inline-block;">Suspend all operations involving a reduction of RCS boron concentration.</span></p> | Immediately     |
|   | <p><u>AND</u></p> <p>B.2 Initiate action to restore one RHR loop to OPERABLE status and operation.</p>   | Immediately     |

Insert 3

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY |
|--|-----------|
| SR 3.4.7.1 Verify one RHR loop is in operation.                                  | 12 hours  |
| SR 3.4.7.2 Verify SG secondary side water level is $\geq$ [17]% in required SGs. | 12 hours  |

(continued)

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 RCS Loops—MODE 5, Loops Not Filled

LCO 3.4.8 Two residual heat removal (RHR) loops shall be OPERABLE and one RHR loop shall be in operation.

-----NOTES-----

1. All RHR pumps may be de-energized for  $\leq 15$  minutes when switching from one loop to another provided:
  - a. [The core outlet temperature is maintained  $> 10^\circ\text{F}$  below saturation temperature.]
  - b. ~~No operations are permitted that would cause a reduction of the RCS boron concentration; and~~
  - c. No draining operations to further reduce the RCS water volume are permitted.
2. One RHR loop may be inoperable for  $\leq 2$  hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.

Insert 5A

~~No operations are permitted that would cause a reduction of the RCS boron concentration; and~~

APPLICABILITY: MODE 5 with RCS loops not filled.

ACTIONS

| CONDITION                   | REQUIRED ACTION   | COMPLETION TIME |
|-----------------------------|---|-----------------|
| A. One RHR loop inoperable. | A.1 Initiate action to restore RHR loop to OPERABLE status. | Immediately     |

(continued)

Insert 3

**ACTIONS (continued)**

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME |
|---|---|-----------------|
| B. Required RHR loops inoperable.<br><br><u>OR</u><br><br>No RHR loop in operation. | B.1 <span style="border: 1px solid black; padding: 2px; display: inline-block;">Suspend all operations involving reduction in RCS boron concentration.</span> | Immediately     |
|   | AND<br><br>B.2 Initiate action to restore one RHR loop to OPERABLE status and operation.  | Immediately     |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY |
|--|-----------|
| SR 3.4.8.1 Verify one RHR loop is in operation.  | 12 hours  |
| SR 3.4.8.2 Verify correct breaker alignment and indicated power are available to the required RHR pump that is not in operation. | 7 days    |



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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.18 RCS Isolated Loop Startup

LCO 3.4.18 Each RCS isolated loop shall remain isolated with:

a. The hot and cold leg isolation valves closed if boron concentration of the isolated loop is less than boron concentration of the operating loops, and

Insert 6

b. The cold leg isolation valve closed if the cold leg temperature of the isolated loop is > [20]°F below the highest cold leg temperature of the operating loops.

APPLICABILITY: MODES 5 and 6.

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME |
|--|--|-----------------|
| A. Isolated loop hot or cold leg isolation valve open with LCO requirements not met. | A.1 -----NOTE-----<br>Only required if boron concentration requirement not met.<br>-----<br>Close hot and cold leg isolation valves. | Immediately     |
|  | OR<br>A.2 -----NOTE-----<br>Only required if temperature requirement not met.<br>-----<br>Close cold leg isolation valve.            | Immediately     |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY  |
|--|--|
| SR 3.4.18.1 Verify cold leg temperature of isolated loop is $\leq$ [20] <sup>o</sup> F below the highest cold leg temperature of the operating loops.  | Within 30 minutes prior to opening the cold leg isolation valve in isolated loop     |
| SR 3.4.18.2 Verify boron concentration of isolated loop is greater than or equal to boron concentration of the operating loops.<br><br><i>Insert 6</i> | Within 2 hours prior to opening the hot or cold leg isolation valve in isolated loop |

**ACTIONS**

| CONDITION  | REQUIRED ACTION   | COMPLETION TIME |
|--|---|-----------------|
| A. (continued)   | A.2.2 Suspend movement of irradiated fuel assemblies.   | Immediately     |
|  | AND   |                 |
|  | A.2.3 <span style="border: 1px solid black; padding: 2px;">Initiate action to suspend operations involving positive reactivity additions</span> | Immediately     |
|  | AND   |                 |
| B. One required DG inoperable.                                 | B.1 Suspend CORE ALTERATIONS.   | Immediately     |
|  | AND   |                 |
|  | B.2 Suspend movement of irradiated fuel assemblies.   | Immediately     |
|  | AND   |                 |
|  | B.3 <span style="border: 1px solid black; padding: 2px;">Initiate action to suspend operations involving positive reactivity additions.</span>  | Immediately     |
| AND  |   |                 |
| B.4 Initiate action to restore required DG to OPERABLE status. | Immediately   |                 |

Insert 8

Insert 8

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

LCO 3.8.5 DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

APPLICABILITY: MODES 5 and 6,  
 During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME |
|--|--|-----------------|
| A. One or more required DC electrical power subsystems inoperable. | A.1.1 Declare affected required feature(s) inoperable.   | Immediately     |
|  | <u>OR</u>  |                 |
|  | A.2.1 Suspend CORE ALTERATIONS.  | Immediately     |
|  | <u>AND</u>   |                 |
|  | A.2.2 Suspend movement of irradiated fuel assemblies.  | Immediately     |
|  | <u>AND</u>   |                 |
|  | A.2.3 <span style="border: 1px solid black; padding: 2px;">Initiate action to suspend operations involving positive reactivity additions.</span> | Immediately     |
|  | <u>AND</u>   |                 |
|  |  | (continued)     |

Insert 8



3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters—Shutdown

LCO 3.8.8 Inverters shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

APPLICABILITY: MODES 5 and 6,  
 During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION  | REQUIRED ACTION                                       | COMPLETION TIME |
|--|---|-----------------|
| A. One or more [required] inverters inoperable.  | A.1 Declare affected required feature(s) inoperable.  | Immediately     |
|  | <u>OR</u>   |                 |
|  | A.2.1 Suspend CORE ALTERATIONS.                       | Immediately     |
|  | <u>AND</u>  |                 |
|  | A.2.2 Suspend movement of irradiated fuel assemblies. | Immediately     |
| <u>AND</u>   |   |                 |
| A.2.3 <span style="border: 1px solid black; padding: 2px;">Initiate action to suspend operations involving positive reactivity additions.</span> | Immediately   |                 |
| <u>AND</u>   |   |                 |
|  |   | (continued)     |

Insert 8

3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems—Shutdown

**LCO 3.8.10** The necessary portion of AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

**APPLICABILITY:** MODES 5 and 6,  
 During movement of irradiated fuel assemblies.

**ACTIONS**

| CONDITION  | REQUIRED ACTION   | COMPLETION TIME |
|--|---|-----------------|
| A. One or more required AC, DC, or AC vital bus electrical power distribution subsystems inoperable. | A.1 Declare associated supported required feature(s) inoperable.  | Immediately     |
|  | <u>OR</u>   |                 |
|  | A.2.1 Suspend CORE ALTERATIONS.   | Immediately     |
|  | <u>AND</u>  |                 |
|  | A.2.2 Suspend movement of irradiated fuel assemblies.   | Immediately     |
|  | <u>AND</u>  |                 |
|  | A.2.3 <span style="border: 1px solid black; padding: 2px;"><del>Initiate action to suspend operations involving positive reactivity additions.</del></span> | Immediately     |
|  | <u>AND</u>  |                 |
|  |   | (continued)     |

Insert 8



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3.9 REFUELING OPERATIONS

3.9.3 Nuclear Instrumentation

LCO 3.9.3 Two source range neutron flux monitors shall be OPERABLE.

APPLICABILITY: MODE 6.

Insert 4

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME  |
|--|--|--|
| A. One [required] source range neutron flux monitor inoperable.  | A.1 Suspend CORE ALTERATIONS.  | Immediately  |
|  | <p><u>AND</u></p> <p>A.2 <del>Suspend positive reactivity additions.</del></p>           | Immediately  |
| B. Two [required] source range neutron flux monitors inoperable. | B.1 Initiate action to restore one source range neutron flux monitor to OPERABLE status. | Immediately  |
|  | <p><u>AND</u></p> <p>B.2 Perform SR 3.9.1.1.</p>   | <p>4 hours</p> <p><u>AND</u></p> <p>Once per 12 hours thereafter</p> |

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3.9 REFUELING OPERATIONS

3.9.5 Residual Heat Removal (RHR) and Coolant Circulation—High Water Level

LCO 3.9.5 One RHR loop shall be OPERABLE and in operation.

-----NOTE-----

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

, coolant with

Insert 7

introduction into

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

ACTIONS

Insert 4

| CONDITION                         | REQUIRED ACTION   | COMPLETION TIME |
|-----------------------------------|---|-----------------|
| A. RHR loop requirements not met. | A.1 <del>Suspend operations involving a reduction in reactor coolant boron concentration.</del> | Immediately     |
|                                   | <u>AND</u>  |                 |
|                                   | A.2 Suspend loading irradiated fuel assemblies in the core.                                     | Immediately     |
|                                   | <u>AND</u>  |                 |
|                                   | A.3 Initiate action to satisfy RHR loop requirements.   | Immediately     |
|                                   | <u>AND</u>  |                 |
|                                   |   | (continued)     |



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3.9 REFUELING OPERATIONS

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

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

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

ACTIONS

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

Insert 4

BASES

---

ACTIONS

G.1 and G.2 (continued)

level. The Completion Time of 2 hours will allow a slow and controlled power reduction to less than the P-6 setpoint and takes into account the low probability of occurrence of an event during this period that may require the protection afforded by the NIS Intermediate Range Neutron Flux trip.

Insert B1 →

H.1

Condition H applies to the Intermediate Range Neutron Flux trip when THERMAL POWER is below the P-6 setpoint and one or two channels are inoperable. Below the P-6 setpoint, the NIS source range performs the monitoring and protection functions. The inoperable NIS intermediate range channel(s) must be returned to OPERABLE status prior to increasing power above the P-6 setpoint. The NIS intermediate range channels must be OPERABLE when the power level is above the capability of the source range, P-6, and below the capability of the power range, P-10.

I.1

Condition I applies to one inoperable Source Range Neutron Flux trip channel when in MODE 2, below the P-6 setpoint, and performing a reactor startup. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With one of the two channels inoperable, operations involving positive reactivity additions shall be suspended immediately.

This will preclude any power escalation. With only one source range channel OPERABLE, core protection is severely reduced and any actions that add positive reactivity to the core must be suspended immediately.

Insert B1 →

J.1

Condition J applies to two inoperable Source Range Neutron Flux trip channels when in MODE 2, below the P-6 setpoint, and performing a reactor startup, or in MODE 3, 4, or 5 with the RTBs closed and the CRD System capable of rod withdrawal. With the unit in this Condition, below P-6, the

(continued)

BASES

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ACTIONS

B.1, B.2.1, B.2.2.1, and B.2.2.2 (continued)

once per 12 hours thereafter. This backup action is intended to confirm that no unintended boron dilution has occurred while the BDPS was inoperable, and that the required SDM has been maintained. The specified Completion Time takes into consideration sufficient time for the initial determination of SDM and other information available in the control room related to SDM.

Insert B2

SURVEILLANCE  
REQUIREMENTS

The BDPS trains are subject to a COT and a CHANNEL CALIBRATION.

SR 3.3.9.1

SR 3.3.9.1 requires the performance of a COT every [92] days, to ensure that each train of the BDPS and associated trip setpoints are fully operational. This test shall include verification that the boron dilution alarm setpoint is equal to or less than an increase of twice the count rate within a 10 minute period. The Frequency of [92] days is consistent with the requirements for source range channels in WCAP-10271-P-A (Ref. 2).

SR 3.3.9.2

SR 3.3.9.2 is the performance of a CHANNEL CALIBRATION every [18] months. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy. For the BDPS, the CHANNEL CALIBRATION shall include verification that on a simulated or actual boron dilution flux doubling signal the centrifugal charging pump suction valves from the RWST open, and the normal CVCS volume control tank discharge valves close in the required closure time of  $\leq 20$  seconds.

The Frequency is based on operating experience and consistency with the typical industry refueling cycle.

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(continued)

BASES

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ACTIONS

J.1 (continued)

NIS source range performs the monitoring and protection functions. With both source range channels inoperable, the RTBs must be opened immediately. With the RTBs open, the core is in a more stable condition and the unit enters Condition L.

K.1 and K.2

Condition K applies to one inoperable source range channel in MODE 3, 4, or 5 with the RTBs closed and the CRD System capable of rod withdrawal. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With one of the source range channels inoperable, 48 hours is allowed to restore it to an OPERABLE status. If the channel cannot be returned to an OPERABLE status, 1 additional hour is allowed to open the RTBs. Once the RTBs are open, the core is in a more stable condition and the unit enters Condition L. The allowance of 48 hours to restore the channel to OPERABLE status, and the additional hour to open the RTBs, are justified in Reference 7.

L.1, L.2, and L.3

Condition L applies when the required number of OPERABLE Source Range Neutron Flux channels is not met in MODE 3, 4, or 5 with the RTBs open. With the unit in this Condition, the NIS source range performs the monitoring and protection functions. With less than the required number of source range channels OPERABLE, operations involving positive reactivity additions shall be suspended immediately. ~~This will preclude any power escalation.~~ This In addition to suspension of positive reactivity additions, all valves that could add unborated water to the RCS must be closed within 1 hour as specified in LCO 3.9.2. The isolation of unborated water sources will preclude a boron dilution accident.

Also, the SDM must be verified within 1 hour and once every 12 hours thereafter as per SR 3.1.1.1, SDM verification. With no source range channels OPERABLE, core protection is severely reduced. Verifying the SDM within 1 hour allows

(continued)

BASES

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ACTIONS

L.1, L.2, and L.3 (continued)

sufficient time to perform the calculations and determine that the SDM requirements are met. The SDM must also be verified once per 12 hours thereafter to ensure that the core reactivity has not changed. Required Action L.1 precludes any positive reactivity additions; therefore, core reactivity should not be increasing, and a 12 hour Frequency is adequate. The Completion Times of within 1 hour and once per 12 hours are based on operating experience in performing the Required Actions and the knowledge that unit conditions will change slowly.

Insert  
B 2 →

M.1 and M.2

Condition M applies to the following reactor trip Functions:

- Pressurizer Pressure—Low;
- Pressurizer Water Level—High;
- Reactor Coolant Flow—Low (Two Loops);
- RCP Breaker Position (Two Loops);
- Undervoltage RCPs; and
- Underfrequency RCPs.

With one channel inoperable, the inoperable channel must be placed in the tripped condition within 6 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one additional channel to initiate a reactor trip above the P-7 setpoint and below the P-8 setpoint. These Functions do not have to be OPERABLE below the P-7 setpoint because there are no loss of flow trips below the P-7 setpoint. The 6 hours allowed to place the channel in the tripped condition is justified in Reference 7. An additional 6 hours is allowed to reduce THERMAL POWER to below P-7 if the inoperable channel cannot be restored to OPERABLE status or placed in trip within the specified Completion Time.

Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant

(continued)

BASES

LCO  
(continued)

values of the coastdown curve must be revalidated by conducting the test again. Another test performed during the startup testing program is the validation of rod drop times during cold conditions, both with and without flow.

The no flow test may be performed in MODE 3, 4, or 5 and requires that the pumps be stopped for a short period of time. The Note permits the de-energizing of the pumps in order to perform this test and validate the assumed analysis values. As with the validation of the pump coastdown curve, this test should be performed only once unless the flow characteristics of the RCS are changed. The 1 hour time period specified is adequate to perform the desired tests, and operating experience has shown that boron stratification is not a problem during this short period with no forced flow.

Utilization of the Note is permitted provided the following conditions are met, along with any other conditions imposed by initial startup test procedures:

- a. No operations are permitted that would dilute the RCS boron concentration, thereby maintaining the margin to criticality. Boron reduction is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation; and
- b. Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

An OPERABLE RCS loop consists of one OPERABLE RCP and one OPERABLE SG in accordance with the Steam Generator Tube Surveillance Program, which has the minimum water level specified in SR 3.4.5.2. An RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required.

With coolant at boron concentrations less than required to assure the SOM of LCO 3.1.1.

With coolant at boron concentrations less than required to assure SOM is maintained

APPLICABILITY

In MODE 3, this LCO ensures forced circulation of the reactor coolant to remove decay heat from the core and to provide proper boron mixing. The most stringent condition of the LCO, that is, two RCS loops OPERABLE and two RCS loops in operation, applies to MODE 3 with RTBs in the

(continued)

BASES

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ACTIONS

C.1 and C.2 (continued)

the Required Action is either to restore the required RCS loop to operation or to de-energize all CRDMs by opening the RTBs or de-energizing the motor generator (MG) sets. When the RTBs are in the closed position and Rod Control System capable of rod withdrawal, it is postulated that a power excursion could occur in the event of an inadvertent control rod withdrawal. This mandates having the heat transfer capacity of two RCS loops in operation. If only one loop is in operation, the RTBs must be opened. The Completion Times of 1 hour to restore the required RCS loop to operation or de-energize all CRDMs is adequate to perform these operations in an orderly manner without exposing the unit to risk for an undue time period.

D.1, D.2, and D.3

Insert B5

If [two] RCS loops are inoperable or no RCS loop is in operation, except as during conditions permitted by the Note in the LCO section, all CRDMs must be de-energized by opening the RTBs or de-energizing the MG sets. All operations involving ~~a reduction of RCS boron concentration~~ must be suspended, and action to restore one of the RCS loops to OPERABLE status and operation must be initiated. Boron dilution requires forced circulation for proper mixing, and opening the RTBs or de-energizing the MG sets removes the possibility of an inadvertent rod withdrawal. The immediate Completion Time reflects the importance of maintaining operation for heat removal. The action to restore must be continued until one loop is restored to OPERABLE status and operation.

Insert B4

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SURVEILLANCE  
REQUIREMENTS

SR 3.4.5.1

This SR requires verification every 12 hours that the required loops are in operation. Verification includes flow rate, temperature, and pump status monitoring, which help ensure that forced flow is providing heat removal. The Frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the control room to monitor RCS loop performance.

(continued)

BASES

LCO  
(continued)

loops and RHR loops. Any one loop in operation provides enough flow to remove the decay heat from the core with forced circulation. An additional loop is required to be OPERABLE to provide redundancy for heat removal.

Note 1 permits all RCPs or RHR pumps to be de-energized for  $\leq 1$  hour per 8 hour period. The purpose of the Note is to permit tests that are designed to validate various accident analyses values. One of the tests performed during the startup testing program is the validation of rod drop times during cold conditions, both with and without flow. The no flow test may be performed in MODE 3, 4, or 5 and requires that the pumps be stopped for a short period of time. The Note permits the de-energizing of the pumps in order to perform this test and validate the assumed analysis values. If changes are made to the RCS that would cause a change to the flow characteristics of the RCS, the input values must be revalidated by conducting the test again. The 1 hour time period is adequate to perform the test, and operating experience has shown that boron stratification is not a problem during this short period with no forced flow.

Utilization of Note 1 is permitted provided the following conditions are met along with any other conditions imposed by initial startup test procedures:

- a. No operations are permitted that would dilute the RCS boron concentration, therefore maintaining the margin to criticality. Boron reduction is prohibited because a uniform concentration/distribution throughout the RCS cannot be ensured when in natural circulation; and
- b. Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

Note 2 requires that the secondary side water temperature of each SG be  $\leq [50]^\circ\text{F}$  above each of the RCS cold leg temperatures before the start of an RCP with any RCS cold leg temperature  $\leq 275^\circ\text{F}$ . This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started.

An OPERABLE RCS loop comprises an OPERABLE RCP and an OPERABLE SG in accordance with the Steam Generator Tube

(continued)

With coolant with boron concentrations less than required to meet SAM of LCO 3.1.1

With coolant at boron concentrations less than required to assure SOM is maintained



BASES

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ACTIONS

B.1 (continued)

loop must be restored to OPERABLE status to provide a redundant means for decay heat removal.

If the parameters that are outside the limits cannot be restored, the unit must be brought to MODE 5 within 24 hours. Bringing the unit to MODE 5 is a conservative action with regard to decay heat removal. With only one RHR loop OPERABLE, redundancy for decay heat removal is lost and, in the event of a loss of the remaining RHR loop, it would be safer to initiate that loss from MODE 5 ( $\leq 200^{\circ}\text{F}$ ) rather than MODE 4 (200 to  $300^{\circ}\text{F}$ ). The Completion Time of 24 hours is a reasonable time, based on operating experience, to reach MODE 5 from MODE 4 in an orderly manner and without challenging plant systems.

C.1 and C.2

Insert B5

If no loop is OPERABLE or in operation, except during conditions permitted by Note 1 in the LCO section, all operations involving ~~a reduction of RCS boron concentration~~ must be suspended and action to restore one RCS or RHR loop to OPERABLE status and operation must be initiated. ~~Boron dilution requires forced circulation for proper mixing, and~~ the margin to criticality must not be reduced in this type of operation. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal. The action to restore must be continued until one loop is restored to OPERABLE status and operation.

Required

Insert B4

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SURVEILLANCE  
REQUIREMENTS

SR 3.4.6.1

This SR requires verification every 12 hours that one RCS or RHR loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The Frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the control room to monitor RCS and RHR loop performance.

(continued)

With coolant with boron concentrations less than required to meet SAM of LCO 3.1.1

BASES

LCO  
(continued)

With coolant at boron concentrations less than required to assure SAM is maintained

- a. No operations are permitted that would dilute the RCS boron concentration, therefore maintaining the margin to criticality. Boron reduction is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation; and
- b. Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

Note 2 allows one RHR loop to be inoperable for a period of up to 2 hours, provided that the other RHR loop is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable loop during the only time when such testing is safe and possible.

Note 3 requires that the secondary side water temperature of each SG be  $\leq [50]^{\circ}\text{F}$  above each of the RCS cold leg temperatures before the start of a reactor coolant pump (RCP) with an RCS cold leg temperature  $\leq [275]^{\circ}\text{F}$ . This restriction is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started.

Note 4 provides for an orderly transition from MODE 5 to MODE 4 during a planned heatup by permitting removal of RHR loops from operation when at least one RCS loop is in operation. This Note provides for the transition to MODE 4 where an RCS loop is permitted to be in operation and replaces the RCS circulation function provided by the RHR loops.

RHR pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. An OPERABLE SG can perform as a heat sink when it has an adequate water level and is OPERABLE in accordance with the Steam Generator Tube Surveillance Program.

APPLICABILITY

In MODE 5 with RCS loops filled, this LCO requires forced circulation of the reactor coolant to remove decay heat from the core and to provide proper boron mixing. One loop of RHR provides sufficient circulation for these purposes. However, one additional RHR loop is required to be OPERABLE,

(continued)

## BASES

APPLICABILITY (continued) or the secondary side water level of at least [two] SGs is required to be  $\geq$  [17]%.  
 Operation in other MODES is covered by:

- LCO 3.4.4, "RCS Loops—MODES 1 and 2";
- LCO 3.4.5, "RCS Loops—MODE 3";
- LCO 3.4.6, "RCS Loops—MODE 4";
- LCO 3.4.8, "RCS Loops—MODE 5, Loops Not Filled";
- LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation—High Water Level" (MODE 6); and
- LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation—Low Water Level" (MODE 6).

## ACTIONS

A.1 and A.2

If one RHR loop is inoperable and the required SGs have secondary side water levels  $<$  [17]%, redundancy for heat removal is lost. Action must be initiated immediately to restore a second RHR loop to OPERABLE status or to restore the required SG secondary side water levels. Either Required Action A.1 or Required Action A.2 will restore redundant heat removal paths. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

B.1 and B.2

If no RHR loop is in operation, except during conditions permitted by Note 1, or if no loop is OPERABLE, all operations involving ~~a reduction of RCS boron concentration~~ must be suspended and action to restore one RHR loop to OPERABLE status and operation must be initiated. ~~To prevent boron dilution, forced circulation is required to provide proper mixing and preserve the margin to criticality in this type of operation.~~ The immediate Completion Times reflect the importance of maintaining operation for heat removal.

Insert  
B4

Insert B5

(continued)

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BASES

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LCO  
(continued)

Note 1 permits all RHR pumps to be de-energized for  $\leq 15$  minutes when switching from one loop to another. The circumstances for stopping both RHR pumps are to be limited to situations when the outage time is short [and core outlet temperature is maintained  $> 10^\circ\text{F}$  below saturation temperature]. The Note prohibits boron dilution or draining operations when RHR forced flow is stopped.

With coolant at boron concentrations less than required to assure SOM of LCO 3.1.1 is maintained

Note 2 allows one RHR loop to be inoperable for a period of  $\leq 2$  hours, provided that the other loop is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable loop during the only time when these tests are safe and possible.

An OPERABLE RHR loop is comprised of an OPERABLE RHR pump capable of providing forced flow to an OPERABLE RHR heat exchanger. RHR pumps are OPERABLE if they are capable of being powered and are able to provide flow if required.

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APPLICABILITY

In MODE 5 with loops not filled, this LCO requires core heat removal and coolant circulation by the RHR System.

Operation in other MODES is covered by:

- LCO 3.4.4, "RCS Loops—MODES 1 and 2";
  - LCO 3.4.5, "RCS Loops—MODE 3";
  - LCO 3.4.6, "RCS Loops—MODE 4";
  - LCO 3.4.7, "RCS Loops—MODE 5, Loops Filled";
  - LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation—High Water Level" (MODE 6); and
  - LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation—Low Water Level" (MODE 6).
- 

ACTIONS

A.1

If only one RHR loop is OPERABLE and in operation, redundancy for RHR is lost. Action must be initiated to restore a second loop to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

(continued)

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BASES

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ACTIONS  
(continued)

B.1 and B.2

Insert B5

If no required RHR loops are OPERABLE or in operation, except during conditions permitted by Note 1, all operations involving a reduction of RCS boron concentration must be suspended and action must be initiated immediately to restore an RHR loop to OPERABLE status and operation. Boron dilution requires forced circulation for uniform dilution, and the margin to criticality must not be reduced in this type of operation. The immediate Completion Time reflects the importance of maintaining operation for heat removal. The action to restore must continue until one loop is restored to OPERABLE status and operation.

required

Insert B4

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SURVEILLANCE  
REQUIREMENTS

SR 3.4.8.1

This SR requires verification every 12 hours that one loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The Frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the control room to monitor RHR loop performance.

SR 3.4.8.2

Verification that the required number of pumps are OPERABLE ensures that additional pumps can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to the required pumps. The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.

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REFERENCES

None.

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## B 3.4 REACTOR COOLANT SYSTEM (RCS)

### B 3.4.18 RCS Isolated Loop Startup

#### BASES

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#### BACKGROUND

The RCS may be operated with loops isolated in MODES 5 and 6 in order to perform maintenance. While operating with a loop isolated, there is potential for inadvertently opening the isolation valves in the isolated loop. In this event, the coolant in the isolated loop would suddenly begin to mix with the coolant in the operating loops. This situation has the potential of causing a positive reactivity addition with a corresponding reduction of SDM if

- a. The temperature in the isolated loop is lower than the temperature in the operating loops (cold water incident); or
- b. The boron concentration in the isolated loop is lower than the boron concentration ~~(in the operating loops)~~ (boron dilution incident).

Insert 6

As discussed in the FSAR (Ref. 1), the startup of an isolated loop is done in a controlled manner that virtually eliminates any sudden reactivity addition from cold water or boron dilution because:

- a. This LCO and plant operating procedures require that the boron concentration in the isolated loop be maintained higher than the boron concentration of the operating loops, thus eliminating the potential for introducing coolant from the isolated loop that could dilute the boron concentration in the operating loops.
- b. The cold leg loop isolation valve cannot be opened unless the temperatures of both the hot leg and cold leg of the isolated loop are within 20°F of the operating loops. Compliance with the temperature requirement is ensured by operating procedures and automatic interlocks.
- c. Other automatic interlocks prevent opening the hot leg loop isolation valve unless the cold leg loop isolation valve is fully closed. All of the interlocks are part of the Reactor Protection System.

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(continued)


BASES (continued)

**SURVEILLANCE  
REQUIREMENTS**

SR 3.4.18.1

This Surveillance is performed to ensure that the temperature differential between the isolated loop and the operating loops is  $\leq [20]^{\circ}\text{F}$ . Performing the Surveillance 30 minutes prior to opening the cold leg isolation valve in the isolated loop provides reasonable assurance, based on engineering judgment, that the temperature differential will stay within limits until the cold leg isolation valve is opened. This Frequency has been shown to be acceptable through operating experience.

SR 3.4.18.2

 To ensure that the boron concentration of the isolated loop is greater than or equal to the boron concentration ~~of the~~ operating loops, a Surveillance is performed 2 hours prior to opening either the hot or cold leg isolation valve. Performing the Surveillance 2 hours prior to opening either the hot or cold leg isolation valve provides reasonable assurance the boron concentration difference will stay within acceptable limits until the loop is unisolated. This Frequency has been shown to be acceptable through operating experience.

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**REFERENCES**

1. FSAR, Section [15.2.6].
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BASES

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ACTIONS  
(continued)

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4

With the offsite circuit not available to all required trains, the option would still exist to declare all required features inoperable. Since this option may involve undesired administrative efforts, the allowance for sufficiently conservative actions is made. With the required DG inoperable, the minimum required diversity of AC power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. ~~The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SDM is maintained.~~

Insert  
B6



Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

Pursuant to LCO 3.0.6, the Distribution System's ACTIONS would not be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A are modified by a Note to indicate that when Condition A is entered with no AC power to any required ESF bus, the ACTIONS for LCO 3.8.10 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit, whether or not a train is de-energized. LCO 3.8.10 would provide the appropriate restrictions for the situation involving a de-energized train.

(continued)



BASES

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). ~~The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained.~~

Insert  
B6



Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.8. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

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(continued)

## BASES

## ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

required features inoperable with the associated inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained.

Insert  
B6

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power or powered from a constant voltage source transformer.

SURVEILLANCE  
REQUIREMENTSSR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

(continued)

BASES (continued)

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required features may require redundant trains of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem train may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystem LCO's Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).

Insert B7 Insert B8

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the unit safety systems.

Notwithstanding performance of the above conservative Required Actions, a required residual heat removal (RHR) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the RHR ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring RHR inoperable, which results in taking the appropriate RHR actions.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power.

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(continued)

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BASES

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LCO (continued)  $\leq 0.95$  is maintained during fuel handling operations. Violation of the LCO could lead to an inadvertent criticality during MODE 6.

---

APPLICABILITY This LCO is applicable in MODE 6 to ensure that the fuel in the reactor vessel will remain subcritical. The required boron concentration ensures a  $k_{eff} \leq 0.95$ . Above MODE 6, LCO 3.1.1, "SHUTDOWN MARGIN (SDM) -  $T_{avg} > 200^\circ F$ ," and LCO 3.1.2, "SHUTDOWN MARGIN (SDM) -  $T_{avg} \leq 200^\circ F$ ," ensure that an adequate amount of negative reactivity is available to shut down the reactor and maintain it subcritical.

---

ACTIONS

A.1 and A.2

Continuation of CORE ALTERATIONS or positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the unit in compliance with the LCO. If the boron concentration of any coolant volume in the RCS, the refueling canal, or the refueling cavity is less than its limit, all operations involving CORE ALTERATIONS or positive reactivity additions must be suspended immediately.

Suspension of CORE ALTERATIONS and positive reactivity additions shall not preclude moving a component to a safe position. ←

A.3

Insert B12

In addition to immediately suspending CORE ALTERATIONS and positive reactivity additions, boration to restore the concentration must be initiated immediately.

In determining the required combination of boration flow rate and concentration, no unique Design Basis Event must be satisfied. The only requirement is to restore the boron concentration to its required value as soon as possible. In order to raise the boron concentration as soon as possible, the operator should begin boration with the best source available for unit conditions.

(continued)

## BASES (continued)

## APPLICABILITY

In MODE 6, the source range neutron flux monitors must be OPERABLE to determine changes in core reactivity. There are no other direct means available to check core reactivity levels. In MODES 2, 3, 4, and 5, these same installed source range detectors and circuitry are also required to be OPERABLE by LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation."

## ACTIONS

A.1 and A.2

With only one source range neutron flux monitor OPERABLE, redundancy has been lost. Since these instruments are the only direct means of monitoring core reactivity conditions, CORE ALTERATIONS and ~~positive reactivity additions~~ must be suspended immediately. Performance of Required Action A.1 shall not preclude completion of movement of a component to a safe position.

Insert B11

Insert B7

B.1

With no source range neutron flux monitor OPERABLE, action to restore a monitor to OPERABLE status shall be initiated immediately. Once initiated, action shall be continued until a source range neutron flux monitor is restored to OPERABLE status.

B.2

With no source range neutron flux monitor OPERABLE, there are no direct means of detecting changes in core reactivity. However, since CORE ALTERATIONS and positive reactivity additions are not to be made, the core reactivity condition is stabilized until the source range neutron flux monitors are OPERABLE. This stabilized condition is determined by performing SR 3.9.1.1 to ensure that the required boron concentration exists.

The Completion Time of 4 hours is sufficient to obtain and analyze a reactor coolant sample for boron concentration. The Frequency of once per 12 hours ensures that unplanned changes in boron concentration would be identified. The 12 hour Frequency is reasonable, considering the low

(continued)

BASES

APPLICABLE  
SAFETY ANALYSES  
(continued)

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

LCO

Only one RHR loop is required for decay heat removal in MODE 6, with the water level  $\geq$  23 ft above the top of the reactor vessel flange. Only one RHR loop is required to be OPERABLE, because the volume of water above the reactor vessel flange provides backup decay heat removal capability. At least one RHR loop must be OPERABLE and in operation to provide:

- a. Removal of decay heat;
- b. Mixing of borated coolant to minimize the possibility of criticality; and
- c. Indication of reactor coolant temperature.

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

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

dilute

Insert B9

Insert B10

APPLICABILITY,

One RHR loop must be OPERABLE and in operation in MODE 6, with the water level  $\geq$  23 ft above the top of the reactor vessel flange, to provide decay heat removal. The 23 ft water level was selected because it corresponds to the 23 ft

(continued)

BASES

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APPLICABILITY  
(continued)

requirement established for fuel movement in LCO 3.9.7, "Refueling Cavity Water Level." Requirements for the RHR System in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS), and Section 3.5, Emergency Core Cooling Systems (ECCS). RHR loop requirements in MODE 6 with the water level < 23 ft are located in LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation—Low Water Level."

---

ACTIONS

RHR loop requirements are met by having one RHR loop OPERABLE and in operation, except as permitted in the Note to the LCO.

A.1

If RHR loop requirements are not met, there will be no forced circulation to provide mixing to establish uniform boron concentrations. ~~Reduced boron concentrations cannot occur by the addition of water with a lower boron concentration than that contained in the RCS because all of unborated water sources are isolated.~~

Insert  
B11



A.2

If RHR loop requirements are not met, actions shall be taken immediately to suspend loading of irradiated fuel assemblies in the core. With no forced circulation cooling, decay heat removal from the core occurs by natural convection to the heat sink provided by the water above the core. A minimum refueling water level of 23 ft above the reactor vessel flange provides an adequate available heat sink. Suspending any operation that would increase decay heat load, such as loading a fuel assembly, is a prudent action under this condition.

A.3

If RHR loop requirements are not met, actions shall be initiated and continued in order to satisfy RHR loop requirements. With the unit in MODE 6 and the refueling

(continued)

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BASES

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ACTIONS  
(continued)

B.1

If no RHR loop is in operation, there will be no forced circulation to provide mixing to establish uniform boron concentrations. ~~Reduced boron concentrations cannot occur by the addition of water with a lower boron concentration than that contained in the RCS, because all of the unborated water sources are isolated.~~

Insert  
B11

B.2

If no RHR loop is in operation, actions shall be initiated immediately, and continued, to restore one RHR loop to operation. Since the unit is in Conditions A and B concurrently, the restoration of two OPERABLE RHR loops and one operating RHR loop should be accomplished expeditiously.

B.3

If no RHR loop is in operation, all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere must be closed within 4 hours. With the RHR loop requirements not met, the potential exists for the coolant to boil and release radioactive gas to the containment atmosphere. Closing containment penetrations that are open to the outside atmosphere ensures that dose limits are not exceeded.

The Completion Time of 4 hours is reasonable, based on the low probability of the coolant boiling in that time.

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SURVEILLANCE  
REQUIREMENTS

SR 3.9.6.1

This Surveillance demonstrates that one RHR loop is in operation and circulating reactor coolant. The flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability and to prevent thermal and boron stratification in the core. In addition, during operation of the RHR loop with the water level in the vicinity of the reactor vessel nozzles, the RHR pump suction requirements must be met. The Frequency of 12 hours is sufficient, considering the flow, temperature, pump control,

(continued)



**ACTIONS (continued)**

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME    |
|---|---|--------------------|
| <p>C. CRIS Manual Trip, Actuation Logic, or [one or more required channels of particulate/iodine or gaseous] radiation monitors inoperable [in MODE 5 or 6,] during CORE ALTERATIONS, or during movement of irradiated fuel assemblies.</p> | <p>C.1 -----NOTE-----<br/>Place CREACS in toxic gas protection mode if automatic transfer to toxic gas protection mode inoperable.<br/>-----<br/>Place one CREACS train in emergency radiation protection mode.</p> | <p>Immediately</p> |
|   | <p>OR</p>   |                    |
|   | <p>C.2.1 Suspend movement of irradiated fuel assemblies.</p>  | <p>Immediately</p> |
|   | <p>AND</p>  |                    |
|   | <p>C.2.2 Suspend positive reactivity additions.</p>   | <p>Immediately</p> |
| <p><i>Insert 1</i> →</p>  | <p>AND</p>  |                    |
|   | <p>C.2.3 Suspend CORE ALTERATIONS.</p>  | <p>Immediately</p> |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY       |
|---|-----------------|
| <p>SR 3.3.8.1 Perform a CHANNEL CHECK on the required control room radiation monitor channel.</p> | <p>12 hours</p> |

(continued)

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3.3 INSTRUMENTATION

3.3.13 [Logarithmic] Power Monitoring Channels (Analog)

LCO 3.3.13 Two channels of [logarithmic] power level monitoring instrumentation shall be OPERABLE.

APPLICABILITY: MODES 3, 4, and 5, with the reactor trip circuit breakers open or Control Element Assembly (CEA) Drive System not capable of CEA withdrawal.

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME                                |
|---|--|--|
| A. One or more required channel(s) inoperable.<br><br><i>Insert 1</i> | A.1 Suspend all operations involving positive reactivity additions.  | Immediately                                    |
|   | AND<br>A.2 Perform SDM verification in accordance with SR 3.1.1.1, if $T_{avg} > 200^{\circ}F$ , or SR 3.1.2.1, if $T_{avg} \leq 200^{\circ}F$ . | 4 hours<br>AND<br>Once per 12 hours thereafter |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE                       | FREQUENCY |
|------------------------------------|-----------|
| SR 3.3.13.1 Perform CHANNEL CHECK. | 12 hours  |

(continued)

**ACTIONS (continued)**

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME    |
|---|---|--------------------|
| <p>C. CRIS Manual Trip, Actuation Logic, or required particulate/iodine or gaseous radiation monitors inoperable [in MODE 5 or 6], during CORE ALTERATIONS, or during movement of irradiated fuel assemblies.</p> | <p>C.1 -----NOTE-----<br/>Place CREACS in toxic gas protection mode if automatic transfer to toxic gas protection mode inoperable.<br/>-----<br/>Place one CREACS train in emergency radiation protection mode.</p> | <p>Immediately</p> |
|   | <p>OR</p>   |                    |
|   | <p>C.2.1 Suspend movement of irradiated fuel assemblies.</p>  | <p>Immediately</p> |
|   | <p><u>AND</u><br/>C.2.2 Suspend positive reactivity additions.</p>  | <p>Immediately</p> |
| <p>Insert 1</p>   | <p><u>AND</u><br/>C.2.3 Suspend CORE ALTERATIONS.</p>   | <p>Immediately</p> |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY       |
|---|-----------------|
| <p>SR 3.3.9.1 Perform a CHANNEL CHECK on the required control room radiation monitor channel.</p> | <p>12 hours</p> |

(continued)

3.3 INSTRUMENTATION

3.3.13 [Logarithmic] Power Monitoring Channels (Digital)

LCO 3.3.13 Two channels of [logarithmic] power level monitoring instrumentation shall be OPERABLE.

APPLICABILITY: MODES 3, 4, and 5, with the reactor trip circuit breakers open or Control Element Assembly (CEA) Drive System not capable of CEA withdrawal.

ACTIONS

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME   |
|---|---|---|
| A. One or more required channels inoperable.<br><br><i>Insert 1</i> | A.1 Suspend all operations involving positive reactivity additions.   | Immediately   |
|   | <u>AND</u><br>A.2 Perform SDM verification in accordance with SR 3.1.1.1, if $T_{avg} > 200^{\circ}F$ , or SR 3.1.2.1, if $T_{avg} \leq 200^{\circ}F$ . | 4 hours<br><br><u>AND</u><br>Once per 12 hours thereafter |

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.5 RCS Loops — MODE 3

LCO 3.4.5 [Two] RCS loops shall be OPERABLE and one RCS loop shall be in operation.

-----NOTE-----  
All reactor coolant pumps may be de-energized for ≤ 1 hour per 8 hour period, provided:

- Insert 5** →
- a. ~~No operations are permitted that would cause reduction of the RCS boron concentration, and~~
  - b. Core outlet temperature is maintained at least 10°F below saturation temperature.
- 

APPLICABILITY: MODE 3.

ACTIONS

| CONDITION   | REQUIRED ACTION                                   | COMPLETION TIME |
|---|---|-----------------|
| A. One required RCS loop inoperable.                                      | A.1 Restore required RCS loop to OPERABLE status. | 72 hours        |
| B. Required Action and associated Completion Time of Condition A not met. | B.1 Be in MODE 4.                                 | 12 hours        |

(continued)

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**ACTIONS (continued)**

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME  |
|--|--|--|
| <b>C. No RCS loop OPERABLE.</b><br><br><b>OR</b><br><br><b>No RCS loop in operation.</b> | <b>C.1</b> <span style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">Suspend all operations involving a reduction of RCS boron concentration.</span> | Immediately  |
|  | <b>AND</b><br><br><b>C.2</b> Initiate action to restore one RCS loop to OPERABLE status and operation.   | <div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block; margin: 5px;">INSERT 3</div> |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY |
|--|-----------|
| SR 3.4.5.1 Verify required RCS loop is in operation.   | 12 hours  |
| SR 3.4.5.2 Verify secondary side water level in each steam generator $\geq$ [25]%.<br>[25]%                              | 12 hours  |
| SR 3.4.5.3 Verify correct breaker alignment and indicated power available to the required pump that is not in operation. | 7 days    |

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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops — MODE 4

LCO 3.4.6 Two loops or trains consisting of any combination of RCS loops and shutdown cooling (SDC) trains shall be OPERABLE and at least one loop or train shall be in operation.

-----NOTES-----

1. All reactor coolant pumps (RCPs) and SDC pumps may be de-energized for  $\leq 1$  hour per 8 hour period, provided:

Insert 5

a. ~~No operations are permitted that would cause reduction of the RCS boron concentration; and~~

b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. No RCP shall be started with any RCS cold leg temperature  $\leq [285]^{\circ}\text{F}$  unless:

a. Pressurizer water level is  $< [60]\%$ ; or

b. Secondary side water temperature in each steam generator (SG) is  $< [100]^{\circ}\text{F}$  above each of the RCS cold leg temperatures.

APPLICABILITY: MODE 4.

ACTIONS

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME |
|---|---|-----------------|
| A. One required RCS loop inoperable.<br><br>AND<br><br>Two SDC trains inoperable. | A.1 Initiate action to restore a second loop or train to OPERABLE status. | Immediately     |

(continued)

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**ACTIONS (continued)**

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME                       |
|---|---|---------------------------------------|
| <p>B. One required SDC train inoperable.</p> <p><u>AND</u></p> <p>Two required RCS loops inoperable.</p>            | <p>B.1 Be in MODE 5.</p>  | <p>24 hours</p>                       |
| <p>C. Required RCS loop or SDC train inoperable.</p> <p><u>OR</u></p> <p>No RCS loop or SDC train in operation.</p> | <p>C.1 <del>Suspend all operations involving reduction of RCS boron concentration.</del></p> <p><u>AND</u></p> <p>C.2 Initiate action to restore one loop or train to OPERABLE status and operation.</p> <p><u>INSERT 3</u></p> | <p>Immediately</p> <p>Immediately</p> |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY       |
|--|-----------------|
| <p>SR 3.4.6.1 Verify one RCS loop or SDC train is in operation.</p>                                | <p>12 hours</p> |
| <p>SR 3.4.6.2 Verify secondary side water level in required SG(s) is <math>\geq</math> [25]%. </p> | <p>12 hours</p> |

(continued)



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3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops — MODE 5, Loops Filled

LCO 3.4.7 One shutdown cooling (SDC) train shall be OPERABLE and in operation, and either:

- a. One additional SDC train shall be OPERABLE; or
- b. The secondary side water level of each steam generator (SG) shall be  $\geq$  [25%].

-----NOTES-----

1. The SDC pump of the train in operation may be de-energized for  $\leq$  1 hour per 8 hour period provided:

a. ~~No operations are permitted that would cause reduction of the RCS boron concentration; and~~

Insert 5

b. Core outlet temperature is maintained at least 10°F below saturation temperature.

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

3. No reactor coolant pump (RCP) shall be started with one or more of the RCS cold leg temperatures  $\leq$  [285]°F unless:

a. The pressurizer water level is  $<$  [60]%; or

b. The secondary side water temperature in each SG is  $<$  [100]°F above each of the RCS cold leg temperatures.

4. All SDC trains may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

APPLICABILITY: MODE 5 with RCS loops filled.

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**ACTIONS**

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME                       |
|---|---|---------------------------------------|
| <p>A. One SDC train inoperable.</p> <p><u>AND</u></p> <p>Any SG with secondary side water level not within limit.</p> | <p>A.1 Initiate action to restore a second SDC train to OPERABLE status.</p> <p><u>OR</u></p> <p>A.2 Initiate action to restore SG secondary side water levels to within limits.</p>  | <p>Immediately</p> <p>Immediately</p> |
| <p>B. Required SDC train inoperable.</p> <p><u>OR</u></p> <p>No SDC train in operation.</p>                           | <p>B.1 <div style="border: 1px solid black; padding: 2px; display: inline-block;">Suspend all operations involving reduction in RCS boron concentration.</div></p> <p><u>AND</u></p> <p>B.2 Initiate action to restore one SDC train to OPERABLE status and operation.</p> <p style="text-align: center;"><u>INSERT 3</u></p> | <p>Immediately</p> <p>Immediately</p> |

3.4 REACTOR COOLANT SYSTEM (RCS)

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3.4.8 RCS Loops — MODE 5, Loops Not Filled

LCO 3.4.8 Two shutdown cooling (SDC) trains shall be OPERABLE and one SDC train shall be in operation.

-----NOTES-----

1. All SDC pumps may be de-energized for  $\leq 15$  minutes when switching from one train to another provided:
  - a. [The core outlet temperature is maintained  $> 10^\circ\text{F}$  below saturation temperature;]
  - b. ~~No operations are permitted that would cause a reduction of the RCS boron concentration; and~~
  - c. No draining operations to further reduce the RCS water volume are permitted.
2. One SDC train may be inoperable for  $\leq 2$  hours for surveillance testing provided the other SDC train is OPERABLE and in operation.

Insert 5

APPLICABILITY: MODE 5 with RCS loops not filled.

ACTIONS

| CONDITION                    | REQUIRED ACTION  | COMPLETION TIME |
|------------------------------|--|-----------------|
| A. One SDC train inoperable. | A.1 Initiate action to restore SDC train to OPERABLE status. | Immediately     |

(continued)

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ACTIONS (continued)

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME   |
|---|--|---|
| B. Required SDC trains inoperable.<br><br><u>OR</u><br><br>No SDC train in operation. | B.1 <span style="border: 1px solid black; padding: 2px; display: inline-block; transform: rotate(-15deg);">Suspend all operations involving reduction of RCS boron concentration.</span> | Immediately   |
|   | <u>AND</u><br><br>B.2 Initiate action to restore one SDC train to OPERABLE status and operation.   | <span style="border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block;">INSERT 3</span> |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY |
|--|-----------|
| SR 3.4.8.1 Verify one SDC train is in operation.   | 12 hours  |
| SR 3.4.8.2 Verify correct breaker alignment and indicated power available to the required SDC pump that is not in operation. | 7 days    |

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| ACTIONS                        | CONDITION  | REQUIRED ACTION   | COMPLETION TIME |
|--------------------------------|--|---|-----------------|
| A. (continued)                 | <p>A.2.2 Suspend movement of irradiated fuel assemblies.</p> <p><u>AND</u></p> <p>A.2.3 <del>Initiate action to suspend operations involving positive reactivity additions.</del></p> <p><u>AND</u> <b>INSERT 8</b></p> <p>A.2.4 Initiate action to restore required offsite power circuit to OPERABLE status.</p>                               | <p>Immediately</p> <p>Immediately</p> <p>Immediately</p>                    |                 |
| B. One required DG inoperable. | <p>B.1 Suspend CORE ALTERATIONS.</p> <p><u>AND</u></p> <p>B.2 Suspend movement of irradiated fuel assemblies.</p> <p><u>AND</u></p> <p>B.3 <del>Initiate action to suspend operations involving positive reactivity additions.</del></p> <p><u>AND</u> <b>INSERT 8</b></p> <p>B.4 Initiate action to restore required DG to OPERABLE status.</p> | <p>Immediately</p> <p>Immediately</p> <p>Immediately</p> <p>Immediately</p> |                 |

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3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources — Shutdown

LCO 3.8.5 DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems — Shutdown."

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME    |
|---|--|--------------------|
| <p>A. One or more required DC electrical power subsystems inoperable.</p>   | <p>A.1 Declare affected required feature(s) inoperable.</p>                                    | <p>Immediately</p> |
|   | <p><u>OR</u></p>   |                    |
|   | <p>A.2.1 Suspend CORE ALTERATIONS.</p>   | <p>Immediately</p> |
|   | <p><u>AND</u></p>  |                    |
|   | <p>A.2.2 Suspend movement of irradiated fuel assemblies.</p>                                   | <p>Immediately</p> |
| <p><u>AND</u></p>   |  |                    |
| <p>A.2.3 <span style="border: 1px solid black; padding: 2px;">Initiate action to suspend operations involving positive reactivity additions.</span></p> | <p>Immediately</p>   |                    |
| <p><u>AND</u></p>   | <p><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">INSERTS</span></p> |                    |
|   | <p>(continued)</p>   |                    |

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3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters — Shutdown

LCO 3.8.8 Inverter(s) shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems — Shutdown."

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION                                       | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| A. One or more [required] inverters inoperable. | A.1 Declare affected required feature(s) inoperable.   | Immediately     |
|   | <u>OR</u>  |                 |
|   | A.2.1 Suspend CORE ALTERATIONS.  | Immediately     |
|   | <u>AND</u>   |                 |
|   | A.2.2 Suspend movement of irradiated fuel assemblies.  | Immediately     |
|   | <u>AND</u>   |                 |
|   | A.2.3 <span style="border: 1px solid black; padding: 2px;">Initiate action to suspend operations involving positive reactivity additions.</span> | Immediately     |
|   | <u>AND</u> <span style="border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block;">INSERTS</span>                        |                 |
|   |  | (continued)     |

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3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems — Shutdown

LCO 3.8.10 The necessary portion of AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 5 and 6,  
During movement of irradiated fuel assemblies.

ACTIONS

| CONDITION  | REQUIRED ACTION   | COMPLETION TIME |
|--|---|-----------------|
| A. One or more required AC, DC, or AC vital bus electrical power distribution subsystems inoperable. | A.1 Declare associated supported required feature(s) inoperable.                                    | Immediately     |
|  | <u>OR</u>   |                 |
|  | A.2.1 Suspend CORE ALTERATIONS.   | Immediately     |
|  | <u>AND</u>  |                 |
|  | A.2.2 Suspend movement of irradiated fuel assemblies.   | Immediately     |
|  | <u>AND</u>  |                 |
|  | A.2.3 <del>Initiate action to suspend operations involving positive reactivity additions.</del>     | Immediately     |
|  | <u>AND</u> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">INSERT B</span> |                 |
|  |   | (continued)     |



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3.9 REFUELING OPERATIONS

3.9.2 Nuclear Instrumentation

LCO 3.9.2 Two source range monitors (SRMs) shall be OPERABLE.

APPLICABILITY: MODE 6.

ACTIONS

| CONDITION                          | REQUIRED ACTION  | COMPLETION TIME                                |
|------------------------------------|--|--|
| A. One [required] SRM inoperable.  | A.1 Suspend CORE ALTERATIONS.  | Immediately                                    |
|                                    | AND<br>A.2 <del>Suspend positive reactivity additions.</del><br>INSERT 4 | Immediately                                    |
| B. Two [required] SRMs inoperable. | B.1 Initiate action to restore one SRM to OPERABLE status.               | Immediately                                    |
|                                    | AND<br>B.2 Perform SR 3.9.1.1.   | 4 hours<br>AND<br>Once per 12 hours thereafter |

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3.9 REFUELING OPERATIONS

3.9.4 Shutdown Cooling (SDC) and Coolant Circulation — High Water Level

LCO 3.9.4 One SDC loop shall be in operation.

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

↑ , coolant with      ↑ Introduction into      ↑ Insert 7

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

ACTIONS

| CONDITION                         | REQUIRED ACTION   | COMPLETION TIME |
|-----------------------------------|---|-----------------|
| A. SDC loop requirements not met. | A.1 <del>Suspend operations involving a reduction in reactor coolant boron concentration.</del> | Immediately     |
|                                   | <u>AND</u>  |                 |
|                                   | A.2 Suspend loading irradiated fuel assemblies in the core.                                     | Immediately     |
|                                   | <u>AND</u>  |                 |
|                                   | A.3 Initiate action to satisfy SDC loop requirements.   | Immediately     |
|                                   | <u>AND</u>  |                 |
|                                   |   | (continued)     |

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3.9 REFUELING OPERATIONS

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

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

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

ACTIONS

| CONDITION                                | REQUIRED ACTION   | COMPLETION TIME |
|--|---|-----------------|
| A. One SDC loop inoperable.              | A.1 Initiate action to restore SDC loop to OPERABLE status.   | Immediately     |
|  | OR<br>A.2 Initiate action to establish $\geq$ 23 ft of water above the top of reactor vessel flange.  | Immediately     |
| B. No SDC loop OPERABLE or in operation. | B.1 <div style="border: 1px solid black; padding: 2px; display: inline-block;">Suspend operations involving a reduction in reactor coolant boron concentration.</div> | Immediately     |
|  | AND<br>B.2 Initiate action to restore one SDC loop to OPERABLE status and to operation.   | Immediately     |
|  | AND   | (continued)     |

INSERT 4

BASES

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ACTIONS

A.1, B.1, B.2, C.1, C.2.1, C.2.2, and C.2.3 (continued)

does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours (Required Action B.1) and to MODE 5 within 36 hours (Required Action B.2). The Completion Times of 6 hours and 36 hours for reaching MODES 3 and 5 from MODE 1 are reasonable, based on operating experience and normal cooldown rates, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant safety systems or operators.

Condition C applies to the failure of CRIS Manual Trip, Actuation Logic, and required particulate/iodine and required gaseous radiation monitor channels [in MODE 5 or 6], [during CORE ALTERATIONS,] or when moving irradiated assemblies. The Required Actions are immediately taken to place one OPERABLE CREACS train in the emergency radiation protection mode or to suspend CORE ALTERATIONS, positive reactivity additions, and movement of irradiated fuel assemblies. The Completion Time recognizes the fact that the radiation signals are the only Functions available to initiate control room isolation in the event of a fuel handling accident.

Insert B1



---

SURVEILLANCE  
REQUIREMENTS

SR 3.3.8.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value.

Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

(continued)

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BASES (continued)

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ACTIONS

A.1 and A.2

With one required channel inoperable, it may not be possible to perform a CHANNEL CHECK to verify that the other required channel is OPERABLE. Therefore, with one or more required channels inoperable, the [logarithmic] power monitoring Function cannot be reliably performed. Consequently, the Required Actions are the same for one required channel inoperable or more than one required channel inoperable. The absence of reliable neutron flux indication makes it difficult to ensure SDM is maintained. ~~Required Action A.1, therefore, requires that all positive reactivity additions that are under operator control, such as boron dilution or Reactor Coolant System temperature changes, be halted immediately, preserving SDM.~~

INSERT B1 →

SDM must be verified periodically to ensure that it is being maintained. Both required channels must be restored as soon as possible. The initial Completion Time of 4 hours and once every 12 hours thereafter to perform SDM verification takes into consideration that Required Action A.1 eliminates many of the means by which SDM can be reduced. These Completion Times are also based on operating experience in performing the Required Actions and the fact that plant conditions will change slowly.

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SURVEILLANCE  
REQUIREMENTS

SR 3.3.13.1

SR 3.3.13.1 is the performance of a CHANNEL CHECK on each required channel every 12 hours. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based upon the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

(continued)

BASES

ACTIONS

A.1, B.1, B.2, C.1, C.2.1, C.2.2, and C.2.3 (continued)

does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours (Required Action B.1) and to MODE 5 within 36 hours (Required Action B.2). The Completion Times of 6 hours and 36 hours for reaching MODES 3 and 5 from MODE 1 are reasonable, based on operating experience and normal cooldown rates, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant safety systems or operators.

Condition C applies to the failure of CRIS Manual Trip, Actuation Logic, and required particulate/iodine and required gaseous radiation monitor channels [in MODE 5 or 6], during CORE ALTERATIONS, or when moving irradiated assemblies. The Required Actions are immediately taken to place one OPERABLE CREACS train in the emergency radiation protection mode, or to suspend CORE ALTERATIONS, positive reactivity additions, and movement of irradiated fuel assemblies. The Completion Time recognizes the fact that the radiation signals are the only Functions available to initiate control room isolation in the event of a fuel handling accident.

Insert B1

SURVEILLANCE  
REQUIREMENTS

SR 3.3.9.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value.

Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

(continued)

BASES (continued)

ACTIONS

A channel is inoperable when it does not satisfy the OPERABILITY criteria for the channel's function. These criteria are outlined in the LCO section of the Bases.

A.1 and A.2

With one required channel inoperable, it may not be possible to perform a CHANNEL CHECK to verify that the other required channel is OPERABLE. Therefore, with one or more required channels inoperable, the [logarithmic] power monitoring Function cannot be reliably performed. Consequently, the Required Actions are the same for one required channel inoperable or more than one required channel inoperable. The absence of reliable neutron flux indication makes it difficult to ensure SDM is maintained. [Required Action A.1

INSECT 81 →

~~Therefore requires that all positive reactivity additions that are under operator control, such as boron dilution or Reactor Coolant System temperature changes, be halted immediately, preserving SDM.~~

SDM must be verified periodically to ensure that it is being maintained. Both required channels must be restored as soon as possible. The initial Completion Time of 4 hours and once every 12 hours thereafter to perform SDM verification takes into consideration that Required Action A.1 eliminates many of the means by which SDM can be reduced. These Completion Times are also based on operating experience in performing the Required Actions and the fact that plant conditions will change slowly.

SURVEILLANCE REQUIREMENTS

SR 3.3.13.1

SR 3.3.13.1 is the performance of a CHANNEL CHECK on each required channel every 12 hours. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based upon the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying that the instrumentation

(continued)

BASES (continued)

LCO

The purpose of this LCO is to require [two] RCS loops to be available for heat removal, thus providing redundancy. The LCO requires the [two] loops to be OPERABLE with the intent of requiring both SGs to be capable (> 25% water level) of transferring heat from the reactor coolant at a controlled rate. Forced reactor coolant flow is the required way to transport heat, although natural circulation flow provides adequate removal. A minimum of one running RCP meets the LCO requirement for one loop in operation.

The Note permits a limited period of operation without RCPs. All RCPs may be de-energized for  $\leq 1$  hour per 8 hour period. This means that natural circulation has been established. When in natural circulation, a reduction in boron concentration is prohibited because an even concentration distribution throughout the RCS cannot be ensured. Core outlet temperature is to be maintained at least 10°F below the saturation temperature so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

With coolant at boron concentrations less than required to assure the SOM of LCO 3.1.1 is maintained

In MODES 3, 4, and 5, it is sometimes necessary to stop all RCPs or shutdown cooling (SDC) pump forced circulation (e.g., to change operation from one SDC train to the other, to perform surveillance or startup testing, to perform the transition to and from SDC System cooling, or to avoid operation below the RCP minimum net positive suction head limit). The time period is acceptable because natural circulation is adequate for heat removal, or the reactor coolant temperature can be maintained subcooled and boron stratification affecting reactivity control is not expected.

An OPERABLE loop consists of at least one RCP providing forced flow for heat transport and an SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program. An RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required.

APPLICABILITY

In MODE 3, the heat load is lower than at power; therefore, one RCS loop in operation is adequate for transport and heat removal. A second RCS loop is required to be OPERABLE but not in operation for redundant heat removal capability.

Operation in other MODES is covered by:

(continued)



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BASES

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APPLICABILITY  
(continued)

- LCO 3.4.4, "RCS Loops — MODES 1 and 2";
  - LCO 3.4.6, "RCS Loops — MODE 4";
  - LCO 3.4.7, "RCS Loops — MODE 5, Loops Filled";
  - LCO 3.4.8, "RCS Loops — MODE 5, Loops Not Filled";
  - LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation — High Water Level" (MODE 6); and
  - LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation — Low Water Level" (MODE 6).
- 

ACTIONS

A.1

If one required RCS loop is inoperable, redundancy for forced flow heat removal is lost. The Required Action is restoration of the required RCS loop to OPERABLE status within a Completion Time of 72 hours. This time allowance is a justified period to be without the redundant, nonoperating loop because a single loop in operation has a heat transfer capability greater than that needed to remove the decay heat produced in the reactor core.

B.1

If restoration is not possible within 72 hours, the unit must be placed in MODE 4 within 12 hours. In MODE 4, the plant may be placed on the SDC System. The Completion Time of 12 hours is compatible with required operation to achieve cooldown and depressurization from the existing plant conditions in an orderly manner and without challenging plant systems.

C.1 and C.2

If no RCS loop is in operation, except as provided in Note 1 in the LCO section, all operations involving a reduction of RCS boron concentration must be immediately suspended. This is necessary because boron dilution requires forced circulation for proper homogenization. Action to restore one RCS loop to OPERABLE status and operation shall be initiated immediately and continued until one RCS loop is restored to OPERABLE status and operation. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal.

Insert B5 →

INSERT B4

(continued)

BASES

With coolant at boron concentrations less than required to assure the GPM of LCO 3.1.1 is maintained

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LCO  
(continued)

prohibits boron dilution when forced flow is stopped because an even concentration distribution cannot be ensured. Core outlet temperature is to be maintained at least 10°F below saturation temperature so that no vapor bubble may form and possibly cause a natural circulation flow obstruction. The response of the RCS without the RCPs or SDC pumps depends on the core decay heat load and the length of time that the pumps are stopped. As decay heat diminishes, the effects on RCS temperature and pressure diminish. Without cooling by forced flow, higher heat loads will cause the reactor coolant temperature and pressure to increase at a rate proportional to the decay heat load. Because pressure can increase, the applicable system pressure limits (pressure and temperature (P/T) limits or low temperature overpressure protection (LTOP) limits) must be observed and forced SDC flow or heat removal via the SGs must be re-established prior to reaching the pressure limit. The circumstances for stopping both RCPs or SDC pumps are to be limited to situations where:

- a. Pressure and temperature increases can be maintained well within the allowable pressure (P/T limits and LTOP) and 10°F subcooling limits; or
- b. An alternate heat removal path through the SGs is in operation.

Note 2 requires that either of the following two conditions be satisfied before an RCP may be started with any RCS cold leg temperature  $\leq 285^\circ\text{F}$ :

- a. Pressurizer water level is  $< [60]\%$ ; or
- b. Secondary side water temperature in each SG is  $< [100]^\circ\text{F}$  above each of the RCS cold leg temperatures.

Satisfying either of the above conditions will preclude a large pressure surge in the RCS when the RCP is started.

An OPERABLE RCS loop consists of at least one OPERABLE RCP and an SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program and has the minimum water level specified in SR 3.4.6.2.

Similarly, for the SDC System, an OPERABLE SDC train is composed of the OPERABLE SDC pump(s) capable of providing

(continued)

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BASES

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ACTIONS

B.1 (continued)

from MODE 4, with only one SDC train operating, in an orderly manner and without challenging plant systems.

C.1 and C.2

If no RCS loops or SDC trains are OPERABLE or in operation, except during conditions permitted by Note 1 in the LCO section, all operations involving reduction of RCS boron concentration must be suspended and action to restore one RCS loop or SDC train to OPERABLE status and operation must be initiated. Boron dilution requires forced circulation for proper mixing, and the margin to criticality must not be reduced in this type of operation. The Immediate Completion Times reflect the importance of decay heat removal. The action to restore must continue until one loop or train is restored to operation.

Insert B5

Required

INSERT B4

SURVEILLANCE  
REQUIREMENTS

SR 3.4.6.1

This SR requires verification every 12 hours that one required loop or train is in operation. This ensures forced flow is providing heat removal. Verification includes flow rate, temperature, or pump status monitoring. The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess RCS loop status. In addition, control room indication and alarms will normally indicate loop status.

SR 3.4.6.2

This SR requires verification every 12 hours of secondary side water level in the required SG(s)  $\geq$  [25]%. An adequate SG water level is required in order to have a heat sink for removal of the core decay heat from the reactor coolant. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions.

(continued)

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BASES

APPLICABLE  
SAFETY ANALYSES  
(continued)

RCS Loops — MODE 5 (Loops Filled) have been identified in the NRC Policy Statement as important contributors to risk reduction.

LCO

The purpose of this LCO is to require at least one of the SDC trains be OPERABLE and in operation with an additional SDC train OPERABLE or secondary side water level of each SG shall be  $\geq$  [25]%. One SDC train provides sufficient forced circulation to perform the safety functions of the reactor coolant under these conditions. The second SDC train is normally maintained OPERABLE as a backup to the operating SDC train to provide redundant paths for decay heat removal. However, if the standby SDC train is not OPERABLE, a sufficient alternate method to provide redundant paths for decay heat removal is two SGs with their secondary side water levels  $\geq$  [25%]. Should the operating SDC train fail, the SGs could be used to remove the decay heat.

Note 1 permits all SDC pumps to be de-energized  $\leq$  1 hour per 8 hour period. The circumstances for stopping both SDC trains are to be limited to situations where pressure and temperature increases can be maintained well within the allowable pressure (pressure and temperature and low temperature overpressure protection) and 10°F subcooling limits, or an alternate heat removal path through the SG(s) is in operation.

With coolant at boron concentrations less than required to assure the SON of LCO 3.1.1 is maintained

This LCO is modified by a Note that prohibits boron dilution when SDC forced flow is stopped because an even concentration distribution cannot be ensured. Core outlet temperature is to be maintained at least 10°F below saturation temperature, so that no vapor bubble would form and possibly cause a natural circulation flow obstruction. In this MODE, the SG(s) can be used as the backup for SDC heat removal. To ensure their availability, the RCS loop flow path is to be maintained with subcooled liquid.

In MODE 5, it is sometimes necessary to stop all RCP or SDC forced circulation. This is permitted to change operation from one SDC train to the other, perform surveillance or startup testing, perform the transition to and from the SDC, or to avoid operation below the RCP minimum net positive suction head limit. The time period is acceptable because natural circulation is acceptable for decay heat removal,

(continued)

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BASES

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APPLICABILITY  
(continued)

Operation in other MODES is covered by:

- LCO 3.4.4, "RCS Loops — MODES 1 and 2";
  - LCO 3.4.5, "RCS Loops — MODE 3";
  - LCO 3.4.6, "RCS Loops — MODE 4";
  - LCO 3.4.8, "RCS Loops — MODE 5, Loops Not Filled";
  - LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation — High Water Level" (MODE 6); and
  - LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation — Low Water Level" (MODE 6).
- 

ACTIONS

A.1 and A.2

If the required SDC train is inoperable and any SGs have secondary side water levels < [25%], redundancy for heat removal is lost. Action must be initiated immediately to restore a second SDC train to OPERABLE status or to restore the water level in the required SGs. Either Required Action A.1 or Required Action A.2 will restore redundant decay heat removal paths. The immediate Completion Times reflect the importance of maintaining the availability of two paths for decay heat removal.

B.1 and B.2

If no SDC train is in operation, except as permitted in Note 1, all operations involving the reduction of RCS boron concentration must be suspended. Action to restore one SDC train to OPERABLE status and operation must be initiated. Boron dilution requires forced circulation for proper mixing and the margin to criticality must not be reduced in this type of operation. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal.

Insert B5 →

required

INSERT B4

SURVEILLANCE  
REQUIREMENTS

SR 3.4.7.1

This SR requires verification every 12 hours that one SDC train is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing decay heat removal. The

(continued)

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BASES

LCO  
(continued)

with coolant at boron concentrations less than required to assure the SOM of LCO 3.1.1 is maintained

Note 1 permits the SDC pumps to be de-energized for ≤ 15 minutes when switching from one train to another. The circumstances for stopping both SDC pumps are to be limited to situations when the outage time is short [and the core outlet temperature is maintained → 10°F below saturation temperature]. The Note prohibits boron dilution or draining operations when SDC forced flow is stopped.

Note 2 allows one SDC train to be inoperable for a period of 2 hours provided that the other train is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable train during the only time when these tests are safe and possible.

An OPERABLE SDC train is composed of an OPERABLE SDC pump capable of providing forced flow to an OPERABLE SDC heat exchanger, along with the appropriate flow and temperature instrumentation for control, protection, and indication. SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow if required.

APPLICABILITY

In MODE 5 with loops not filled, this LCO requires core heat removal and coolant circulation by the SDC System.

Operation in other MODES is covered by:

- LCO 3.4.4, "RCS Loops — MODES 1 and 2";
- LCO 3.4.5, "RCS Loops — MODE 3";
- LCO 3.4.6, "RCS Loops — MODE 4";
- LCO 3.4.7, "RCS Loops — MODE 5, Loops Filled";
- LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation — High Water Level" (MODE 6); and
- LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation — Low Water Level" (MODE 6).

ACTIONS

A.1

If the required SDC train is inoperable, redundancy for heat removal is lost. Action must be initiated immediately to restore a second train to OPERABLE status. The Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

(continued)

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BASES

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ACTIONS  
(continued)

B.1 and B.2

If no SDC train is OPERABLE or in operation, except as provided in Note 1, all operations involving the reduction of RCS boron concentration must be suspended. Action to restore one SDC train to OPERABLE status and operation must be initiated immediately. Boron dilution requires forced circulation for proper mixing and the margin to criticality must not be reduced in this type of operation. The immediate Completion Time reflects the importance of maintaining operation for decay heat removal.

Insert B5

required

INSERT B4

---

SURVEILLANCE  
REQUIREMENTS

SR 3.4.8.1

This SR requires verification every 12 hours that one SDC train is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing decay heat removal. The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation and verify operation is within safety analyses assumptions.

SR 3.4.8.2

Verification that the required number of trains are OPERABLE ensures that redundant paths for heat removal are available and that additional trains can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and indicated power available to the required pumps. The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.

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REFERENCES

None.

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BASES

ACTIONS  
(continued)

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4

With the offsite circuit not available to all required trains, the option would still exist to declare all required features inoperable. Since this option may involve undesired administrative efforts, the allowance for sufficiently conservative actions is made. With the required DG inoperable, the minimum required diversity of AC power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions.

INSERT B6

~~The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SDM is maintained.~~

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

Pursuant to LCO 3.0.6, the Distribution System's ACTIONS are not entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A are modified by a Note to indicate that when Condition A is entered with no AC power to any required ESF bus, the ACTIONS for LCO 3.8.10 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit, whether or not a train is de-energized. LCO 3.8.10 provides the appropriate restrictions for the situation involving a de-energized train.

(continued)



TSTF-286, Rev. 2

BASES

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LCO  
(continued)

OPERABLE to support required trains of distribution systems required OPERABLE by LCO 3.8.10, "Distribution Systems — Shutdown." This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

---

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies provide assurance that:

- a. Required features needed to mitigate a fuel handling accident are available;
- b. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- c. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The DC electrical power requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.4.

---

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If two trains are required per LCO 3.8.10, the remaining train with DC power available may be capable of supporting sufficient systems to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare required features inoperable with the associated DC power source(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCO ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). ~~The Required Action to suspend positive reactivity additions does not preclude actions to~~

INSERT B6 →

(continued)

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TSTF-286 Rev. 2

BASES

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

~~maintain or increase reactor vessel inventory, provided the required SDM is maintained.~~

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 states that Surveillances required by SR 3.8.4.1 through SR 3.8.4.8 are applicable in these MODES. See the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

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REFERENCES

1. FSAR, Chapter [6].
  2. FSAR, Chapter [15].
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TSTF-286, Rev. 2

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

Insert B6

continuation of CORE ALTERATIONS, fuel movement, operations with a potential for draining the reactor vessel, and operations with a potential for positive reactivity additions. The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained. By the allowance of the option to declare required features inoperable with the associated inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power or powered from a constant voltage source transformer.

SURVEILLANCE  
REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the

(continued)

TSTF-286, Rev. 2

BASES (continued)

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required features may require redundant trains of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem train may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystems LCO's Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).<sup>A</sup>

Insert B7

INSERT B8

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the unit safety systems.

Notwithstanding performance of the above conservative Required Actions, a required shutdown cooling (SDC) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the SDC ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring SDC inoperable, which results in taking the appropriate SDC actions.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power.

(continued)

TSTF-286, Rev. 2

BASES

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LCO  
(continued)

maintained during fuel handling operations. Violation of the LCO could lead to an inadvertent criticality during MODE 6.

---

APPLICABILITY

This LCO is applicable in MODE 6 to ensure that the fuel in the reactor vessel will remain subcritical. The required boron concentration ensures a  $k_{eff} \leq 0.95$ . Above MODE 6, LCO 3.1.1, "SHUTDOWN MARGIN (SDM) -  $T_{avg} > 200^\circ F$ ," and LCO 3.1.2, "SHUTDOWN MARGIN -  $T_{avg} \leq 200^\circ F$ ," ensure that an adequate amount of negative reactivity is available to shut down the reactor and to maintain it subcritical.

---

ACTIONS

A.1 and A.2

Continuation of CORE ALTERATIONS or positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the unit in compliance with the LCO. If the boron concentration of any coolant volume in the RCS, the refueling canal, or the refueling cavity is less than its limit, all operations involving CORE ALTERATIONS or positive reactivity additions must be suspended immediately.

Insert B12

Suspension of CORE ALTERATIONS and positive reactivity additions shall not preclude moving a component to a safe position.

A.3

In addition to immediately suspending CORE ALTERATIONS  and positive reactivity additions, boration to restore the concentration must be initiated immediately. <EDIT>

In determining the required combination of boration flow rate and concentration, there is no unique design basis event that must be satisfied. The only requirement is to restore the boron concentration to its required value as soon as possible. In order to raise the boron concentration as soon as possible, the operator should begin boration with the best source available for unit conditions.

(continued)

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TSTF-286, Rev. 2

BASES (continued)

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APPLICABILITY

In MODE 6, the SRMs must be OPERABLE to determine changes in core reactivity. There is no other direct means available to check core reactivity levels.

In MODES 2, 3, 4, and 5, the installed source range detectors and circuitry are required to be OPERABLE by LCO 3.3.2, "RPS Instrumentation Shutdown."

---

ACTIONS

A.1 and A.2

With only one SRM OPERABLE, redundancy has been lost. Since these instruments are the only direct means of monitoring core reactivity conditions, CORE ALTERATIONS and positive reactivity additions must be suspended immediately. Performance of Required Action A.1 shall not preclude completion of movement of a component to a safe position.

Insert B.9

Insert B.11

B.1

With no SRM OPERABLE, action to restore a monitor to OPERABLE status shall be initiated immediately. Once initiated, action shall be continued until an SRM is restored to OPERABLE status.

B.2

With no SRM OPERABLE, there is no direct means of detecting changes in core reactivity. However, since CORE ALTERATIONS and positive reactivity additions are not to be made, the core reactivity condition is stabilized until the SRMs are OPERABLE. This stabilized condition is determined by performing SR 3.9.1.1 to verify that the required boron concentration exists.

The Completion Time of 4 hours is sufficient to obtain and analyze a reactor coolant sample for boron concentration. The Frequency of once per 12 hours ensures that unplanned changes in boron concentration would be identified. The 12 hour Frequency is reasonable, considering the low probability of a change in core reactivity during this period.

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(continued)

TSTF-286, Rev. 2

BASES

APPLICABLE  
SAFETY ANALYSES  
(continued)

SDC and Coolant Circulation — High Water Level satisfies  
Criterion 2 of the NRC Policy Statement.

LCO

Only one SDC loop is required for decay heat removal in  
MODE 6, with water level  $\geq$  23 ft above the top of the  
reactor vessel flange. Only one SDC loop is required  
because the volume of water above the reactor vessel flange  
provides backup decay heat removal capability. At least one  
SDC loop must be in operation to provide:

- a. Removal of decay heat;
- b. Mixing of borated coolant to minimize the possibility  
of a criticality; and
- c. Indication of reactor coolant temperature.

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

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

Insert  
B9

dilute

Insert B10

APPLICABILITY

One SDC loop must be in operation in MODE 6, with the water  
level  $\geq$  23 ft above the top of the reactor vessel flange, to  
provide decay heat removal. The 23 ft level was selected  
because it corresponds to the 23 ft requirement established  
for fuel movement in LCO 3.9.6, "Refueling Water Level."

(continued)

TSTF-286, Rev. 2

BASES

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APPLICABILITY  
(continued)

Requirements for the SDC System in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS), and Section 3.5, Emergency Core Cooling Systems (ECCS). SDC loop requirements in MODE 6, with the water level < 23 ft above the top of the reactor vessel flange, are located in LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation — Low Water Level."

---

ACTIONS

SDC loop requirements are met by having one SDC loop OPERABLE and in operation, except as permitted in the Note to the LCO.

A.1

If SDC loop requirements are not met, there will be no forced circulation to provide mixing to establish uniform boron concentrations. ~~Reduced boron concentrations can occur through the addition of water with a lower boron concentration than that contained in the RCS. Therefore, actions that reduce boron concentration shall be suspended immediately.~~

INSERT B11 →

A.2

If SDC loop requirements are not met, actions shall be taken immediately to suspend loading irradiated fuel assemblies in the core. With no forced circulation cooling, decay heat removal from the core occurs by natural convection to the heat sink provided by the water above the core. A minimum refueling water level of 23 ft above the reactor vessel flange provides an adequate available heat sink. Suspending any operation that would increase the decay heat load, such as loading a fuel assembly, is a prudent action under this condition.

A.3

If SDC loop requirements are not met, actions shall be initiated and continued in order to satisfy SDC loop requirements.

(continued)

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BASES

ACTIONS  
(continued)

B.1

If no SDC loop is in operation or no SDC loops are OPERABLE, there will be no forced circulation to provide mixing to establish uniform boron concentrations. Reduced boron concentrations can occur by the addition of water with lower boron concentration than that contained in the RCS. Therefore, actions that reduce boron concentration shall be suspended immediately.

INSECT #11

B.2

If no SDC loop is in operation or no SDC loops are OPERABLE, action shall be initiated immediately and continued without interruption to restore one SDC loop to OPERABLE status and operation. Since the unit is in Conditions A and B concurrently, the restoration of two OPERABLE SDC loops and one operating SDC loop should be accomplished expeditiously.

B.3

If no RHR loop is in operation, all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere must be closed within 4 hours. With the RHR loop requirements not met, the potential exists for the coolant to boil and release radioactive gas to the containment atmosphere. Closing containment penetrations that are open to the outside atmosphere ensures that dose limits are not exceeded.

The Completion Time of 4 hours is reasonable, based on the low probability of the coolant boiling in that time.

SURVEILLANCE  
REQUIREMENTS

SR 3.9.5.1

This Surveillance demonstrates that one SDC loop is operating and circulating reactor coolant. The flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability and to prevent thermal and boron stratification in the core. In addition, this Surveillance demonstrates that the other SDC loop is OPERABLE.

(continued)

## Industry/TSTF Standard Technical Specification Change Traveler

### Ventilation System Envelope Allowed Outage Time

Classification: 3) Improve Specifications

NUREGs Affected:  1430  1431  1432  1433  1434

#### Description:

This change provides specific Conditions and Required Actions for room/barrier degradation (as opposed to ventilation train degradation). The Surveillances that test the integrity of the room/barrier require a positive or negative pressure limit to be satisfied in the area with one required ventilation train operating. While other Surveillances in the same specification test the operability of the ventilation train, these barrier surveillances ensure the envelope leak tightness is adequate to meet the design assumptions. However, there are no corresponding Conditions, Required Actions, or Completion Times associated with failure of these barrier Surveillances. Under existing specifications, LCO 3.0.3 must be entered (for two train inoperability). The proposed change would allow 24 hours (during operating MODES) to restore the capability to maintain proper pressure before requiring the unit to perform an orderly shutdown and also allows intermittent opening of the control room barrier under administrative control.

#### Justification:

Requiring the plant to enter LCO 3.0.3 when the ventilation envelope is not intact is excessive and, in the case of the FBACS OR FSPVS, is not appropriate. Modeling these specifications on the Shield Building specification (NUREG-1431, LCO 3.6.19) for a Dual or Ice Condenser containment would provide consistency within the NUREG. NUREG-1431 Specification 3.6.19 allows 24 hours to restore the envelope to Operable status before requiring an orderly shutdown from operating conditions (MODE 3 in 6 hours, MODE 5 in 36 hours). This would allow for routine repairs. The proposed change is acceptable because of the low probability of a DBA occurring during the 24 hour AOT. Furthermore, (modeling an allowance on the CIV allowance to intermittently open penetrations that are otherwise required to be closed), an LCO Note is added to allow intermittent opening (e.g. as for entering and exiting) without entering the Actions.

|                   |                  |                |                         |
|-------------------|------------------|----------------|-------------------------|
| Industry Contact: | Buschbaum, Denny | (254) 897-5851 | dbuschb1@tuelectric.com |
| NRC Contact:      | Giardina, Bob    | 301-314-3152   | lbb1@nrc.gov            |

### Revision History

#### OG Revision 0

**Revision Status: Closed**

Revision Proposed by: South Texas Project

Revision Description:  
Original Issue

#### Owners Group Review Information

Date Originated by OG: 19-Nov-96

Owners Group Comments  
(No Comments)

Owners Group Resolution: Approved      Date: 19-Nov-96

#### TSTF Review Information

TSTF Received Date: 17-Dec-96      Date Distributed for Review

OG Review Completed:  BWOG  WOG  CEOG  BWROG

1/10/00

**OG Revision 0****Revision Status: Closed****TSTF Comments:**

On hold for WOG Mini-Group changes.

**TSTF Resolution:** Withdrawn **Date:** 27-Apr-97**OG Revision 1****Revision Status: Closed****Revision Proposed by:** WOG**Revision Description:**

Complete replacement of WOG-86, Rev. 0

**Owners Group Review Information****Date Originated by OG:** 27-Apr-97**Owners Group Comments**

(No Comments)

**Owners Group Resolution:** Approved **Date:** 27-Apr-97**TSTF Review Information****TSTF Received Date:** 27-Apr-97 **Date Distributed for Review** 06-Jan-98**OG Review Completed:**  BWO  WOG  CEOG  BWROG**TSTF Comments:**

Applicable to all and accepted.

**TSTF Resolution:** Approved **Date:** 05-Feb-98**NRC Review Information****NRC Received Date:** 29-May-98**NRC Comments:**

7/16/98 - The change has merit; however, the staff does not believe that the proposed change has been fully evaluated by the OG. The SR that supposedly tests the integrity of the room/barrier has two acceptance criteria -- a pressure limit (positive or negative) and a system flow limit. While failure of the pressure limit alone would indicate boundary degradation, failure of the pressure and flow limit while performing the SR could indicate system degradation and/or boundary degradation. Under these circumstances, it is conceivable that both Actions A and B would have to be entered. A number of concerns arise from this:

1) What is to prevent the entering and exiting of Actions A or B over an indefinite period of time? Maybe there should be an overall completion time similar to the completion times specified in Actions for STS 3.7.5.

2) In this situation, the implication is that, in order to verify if it is a boundary inoperability or just a system inoperability resulting in the exiting of Action B, the opposite train would be tested. This is something that has been deleted from TS, and not a prudent thing to do. Do we want to begin this back in this case?

3) The wording of the Condition "Two trains inoperable due to inoperable boundary" could lead to confusion as to which Action to enter (Action B or LCO 3.0.3) under this situation in which both trains are inoperable for other reasons as well as failure to meet this SR and the boundary is inoperable. LCO 3.0.3 should probably be entered, but the wording could lead one to enter Action B.

1/10/00

**OG Revision 1**

**Revision Status: Closed**

As additional concern with the change involves the Actions associated with an inoperable boundary during movement of irradiated fuel assemblies and core alterations. The staff does not believe that, in this situation, fuel movement should be allowed for up to 24 hours.

With this potential loss of radiation filtering, Actions should be taken to immediately suspend fuel movement and/or Core Alterations. This change is applicable to the Control Room and Fuel Building Ventilation Specification.

9/24/98 - NRC to consider the TSTF response to NRC's request to modify and contact Bryan Ford by 10/9/98 to discuss further.

11/12/98 - B. Ford and B. Giardina to discuss on 11/19/98.

Final Resolution: Supceded by Revision

Final Resolution Date: 16-Jul-98

**TSTF Revision 1**

**Revision Status: Closed**

Revision Proposed by: TSTF

Revision Description:

Revised based on NRC comments. The 24 hour Action is limited to operating MODES only and an LCO Note is added to allow intermittent opening in all of MODE 5.

**TSTF Review Information**

TSTF Received Date: 20-Nov-98

Date Distributed for Review 20-Nov-98

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 20-Nov-98

**NRC Review Information**

NRC Received Date: 15-Dec-98

NRC Comments:

(No Comments)

Final Resolution: Supceded by Revision

Final Resolution Date:

**TSTF Revision 2**

**Revision Status: Closed**

Revision Proposed by: NRC

Revision Description:

Eliminated extraneous "OR" from BWOG page 3.7-31 and CEOG page 3.7-32 (left from previous revision).

**TSTF Review Information**

TSTF Received Date: 24-Jan-99

Date Distributed for Review 24-Jan-99

1/10/00

**TSTF Revision 2****Revision Status: Closed**OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 24-Jan-99

**NRC Review Information**

NRC Received Date: 16-Mar-99

NRC Comments:

4/21/99 - In tech branch review (SPLB &amp; SPSB)

6/16/99 - NRC (B. Beckner) stated that TSB will approve separately from other control room issues.

10/3/99 NRC comments:

The staff has completed its review of the latest markup of the Bases for Action B.1 of the Control Room STS contained in this TSTF and conclude that it is acceptable with one exception. Removal of the reference to GDC is unacceptable. We believe that compensatory measures should have some fundamental technical basis, and that for the control room, GDC 19 is the standard for the fundamental technical bases we find acceptable. Compensatory measures that are not consistent with the intent of GDC 19 will likely not provide the protection we believe is necessary. In addition, while this is an acceptable plan for the control room, we believe that a similar compensatory action plan should be provided for all the other buildings, should be consistent with the applicable regulations (GDC 19, Part 100, etc.), and that a similar Bases description should be provided in the other specifications modified by TSTF-287, Revision 2. Following is the proposed Insert 1.

B.1

[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have written procedures available describing compensatory measures to be taken in the event of an intentional or unintentional entry into Condition B.]

If the control room boundary is inoperable in MODES 1, 2, 3, and 4, the CREVS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE control room boundary within 24 hours. During the period that the control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the control room boundary.

Final Resolution: Superseded by Revision

Final Resolution Date: 06-Oct-99

**TSTF Revision 3****Revision Status: Closed**

Revision Proposed by: NRC

Revision Description:

Revised the Bases for Action B.1 to incorporate NRC comments.

**TSTF Review Information**

1/10/00

**TSTF Revision 3****Revision Status: Closed**

TSTF Received Date: 01-Nov-99 Date Distributed for Review 18-Nov-99

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 18-Nov-99

**NRC Review Information**

NRC Received Date: 23-Nov-99

NRC Comments:

(No Comments)

Final Resolution: Superseded by Revision Final Resolution Date:

**TSTF Revision 4****Revision Status: Closed**

Revision Proposed by: NRC

Revision Description:

Revised inserts for areas other than the control room to refer to protecting "plant personnel" instead of "control room operators."

**TSTF Review Information**

TSTF Received Date: 14-Dec-99 Date Distributed for Review 14-Dec-99

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 14-Dec-99

**NRC Review Information**

NRC Received Date: 27-Dec-99

NRC Comments:

1/10/00 - NRC requested modifications.

Final Resolution: Superseded by Revision Final Resolution Date:

**TSTF Revision 5****Revision Status: Active****Next Action: NRC**

Revision Proposed by: NRC

Revision Description:

Revised to incorporate NRC comments. The Bases inserts for the non-Control Room specifications were revised to include reference to the applicable General Design Criteria and 10 CFR Part 100.

**TSTF Review Information**

1/10/00

**TSTF Revision 5****Revision Status: Active****Next Action: NRC**

TSTF Received Date: 10-Jan-00 Date Distributed for Review 10-Jan-00

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 10-Jan-00

**NRC Review Information**

NRC Received Date: 11-Jan-00

NRC Comments:

(No Comments)

Final Resolution: NRC Action Pending

Final Resolution Date:

**Incorporation Into the NUREGs**

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

**Affected Technical Specifications**

|                       |  |                     |
|-----------------------|--|---------------------|
| LCO 3.7.10            | CREVS  | NUREG(s)- 1430 Only |
| LCO 3.7.10 Bases      | CREVS  | NUREG(s)- 1430 Only |
| Action 3.7.10.B       | CREVS  | NUREG(s)- 1430 Only |
|                       | Change Description: New Condition                |                     |
| Action 3.7.10.B       | CREVS  | NUREG(s)- 1430 Only |
|                       | Change Description: Renamed 3.7.10.C and Revised |                     |
| Action 3.7.10.B Bases | CREVS  | NUREG(s)- 1430 Only |
|                       | Change Description: Renamed 3.7.10.C and Revised |                     |
| Action 3.7.10.B Bases | CREVS  | NUREG(s)- 1430 Only |
|                       | Change Description: New Condition                |                     |
| Action 3.7.10.C       | CREVS  | NUREG(s)- 1430 Only |
|                       | Change Description: Renamed 3.7.10.D             |                     |
| Action 3.7.10.C Bases | CREVS  | NUREG(s)- 1430 Only |
|                       | Change Description: Renamed 3.7.10.D             |                     |
| Action 3.7.10.D       | CREVS  | NUREG(s)- 1430 Only |
|                       | Change Description: Renamed 3.7.10.E and Revised |                     |
| Action 3.7.10.D Bases | CREVS  | NUREG(s)- 1430 Only |
|                       | Change Description: Renamed 3.7.10.E             |                     |

1/10/00

|                       |                     |                              |                     |
|-----------------------|---------------------|------------------------------|---------------------|
| Action 3.7.10.E       | CREVS               |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | Renamed 3.7.10.F             |                     |
| Action 3.7.10.E Bases | CREVS               |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | Renamed 3.7.10.F and Revised |                     |
| LCO 3.7.12            | EVS                 |                              | NUREG(s)- 1430 Only |
| LCO 3.7.12 Bases      | EVS                 |                              | NUREG(s)- 1430 Only |
| Action 3.7.12.B       | EVS                 |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | Renamed 3.7.12.C             |                     |
| Action 3.7.12.B       | EVS                 |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | New Condition                |                     |
| Action 3.7.12.B Bases | EVS                 |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | Renamed 3.7.12.C and Revised |                     |
| Action 3.7.12.B Bases | EVS                 |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | New Condition                |                     |
| LCO 3.7.13            | FSPVS               |                              | NUREG(s)- 1430 Only |
| LCO 3.7.13 Bases      | FSPVS               |                              | NUREG(s)- 1430 Only |
| Action 3.7.13.B       | FSPVS               |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | New Condition                |                     |
| Action 3.7.13.B       | FSPVS               |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | Renamed 3.7.13.C and Revised |                     |
| Action 3.7.13.B Bases | FSPVS               |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | Renamed 3.7.13.C and Revised |                     |
| Action 3.7.13.B Bases | FSPVS               |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | New Condition                |                     |
| Action 3.7.13.C       | FSPVS               |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | Renamed 3.7.13.D             |                     |
| Action 3.7.13.C Bases | FSPVS               |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | Renamed 3.7.13.D             |                     |
| Action 3.7.13.D       | FSPVS               |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | Renamed 3.7.13.E             |                     |
| Action 3.7.13.D Bases | FSPVS               |                              | NUREG(s)- 1430 Only |
|                       | Change Description: | Renamed 3.7.13.E             |                     |
| LCO 3.7.10            | CREFS               |                              | NUREG(s)- 1431 Only |
| LCO 3.7.10 Bases      | CREFS               |                              | NUREG(s)- 1431 Only |

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|                       |                     |                              |                     |
|-----------------------|---------------------|------------------------------|---------------------|
| Action 3.7.10.B       | CREFS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | New Condition                |                     |
| Action 3.7.10.B       | CREFS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.10.C and Revised |                     |
| Action 3.7.10.B Bases | CREFS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.10.C and Revised |                     |
| Action 3.7.10.B Bases | CREFS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | New Condition                |                     |
| Action 3.7.10.C       | CREFS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.10.D             |                     |
| Action 3.7.10.C Bases | CREFS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.10.D             |                     |
| Action 3.7.10.D       | CREFS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.10.E             |                     |
| Action 3.7.10.D Bases | CREFS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.10.E             |                     |
| Action 3.7.10.E       | CREFS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.10.F and Revised |                     |
| Action 3.7.10.E Bases | CREFS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.10.F and Revised |                     |
| LCO 3.7.12            | ECCS PREACS         |                              | NUREG(s)- 1431 Only |
| LCO 3.7.12 Bases      | ECCS PREACS         |                              | NUREG(s)- 1431 Only |
| Action 3.7.12.B       | ECCS PREACS         |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | New Condition                |                     |
| Action 3.7.12.B       | ECCS PREACS         |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.12.C             |                     |
| Action 3.7.12.B Bases | ECCS PREACS         |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.12.C and Revised |                     |
| Action 3.7.12.B Bases | ECCS PREACS         |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | New Condition                |                     |
| LCO 3.7.13            | FBACS               |                              | NUREG(s)- 1431 Only |
| LCO 3.7.13 Bases      | FBACS               |                              | NUREG(s)- 1431 Only |
| Action 3.7.13.B       | FBACS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | New Condition                |                     |

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|                       |                     |                              |                     |
|-----------------------|---------------------|------------------------------|---------------------|
| Action 3.7.13.B       | FBACS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.13.C and Revised |                     |
| Action 3.7.13.B Bases | FBACS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | New Condition                |                     |
| Action 3.7.13.B Bases | FBACS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.13.C and Revised |                     |
| Action 3.7.13.C       | FBACS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.13.D             |                     |
| Action 3.7.13.C Bases | FBACS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.13.D             |                     |
| Action 3.7.13.D       | FBACS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.13.E             |                     |
| Action 3.7.13.D Bases | FBACS               |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.13.E             |                     |
| LCO 3.7.14            | PREACS              |                              | NUREG(s)- 1431 Only |
| LCO 3.7.14 Bases      | PREACS              |                              | NUREG(s)- 1431 Only |
| Action 3.7.14.B       | PREACS              |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.14.C             |                     |
| Action 3.7.14.B       | PREACS              |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | New Condition                |                     |
| Action 3.7.14.B Bases | PREACS              |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | New Condition                |                     |
| Action 3.7.14.B Bases | PREACS              |                              | NUREG(s)- 1431 Only |
|                       | Change Description: | Renamed 3.7.14.C and Revised |                     |
| LCO 3.7.11            | CREACS              |                              | NUREG(s)- 1432 Only |
| LCO 3.7.11 Bases      | CREACS              |                              | NUREG(s)- 1432 Only |
| Action 3.7.11.B       | CREACS              |                              | NUREG(s)- 1432 Only |
|                       | Change Description: | Renamed 3.7.11.C and Revised |                     |
| Action 3.7.11.B       | CREACS              |                              | NUREG(s)- 1432 Only |
|                       | Change Description: | New Condition                |                     |
| Action 3.7.11.B Bases | CREACS              |                              | NUREG(s)- 1432 Only |
|                       | Change Description: | Renamed 3.7.11.C and Revised |                     |
| Action 3.7.11.B Bases | CREACS              |                              | NUREG(s)- 1432 Only |
|                       | Change Description: | New Condition                |                     |

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|                       |  |                     |
|-----------------------|--|---------------------|
| Action 3.7.11.C       | CREACS   | NUREG(s)- 1432 Only |
|                       | Change Description: Renamed 3.7.11.D             |                     |
| Action 3.7.11.C Bases | CREACS   | NUREG(s)- 1432 Only |
|                       | Change Description: Renamed 3.7.10.D             |                     |
| Action 3.7.11.D       | CREACS   | NUREG(s)- 1432 Only |
|                       | Change Description: Renamed 3.7.11.E and Revised |                     |
| Action 3.7.11.D Bases | CREACS   | NUREG(s)- 1432 Only |
|                       | Change Description: Renamed 3.7.11.E and Revised |                     |
| Action 3.7.11.E       | CREACS   | NUREG(s)- 1432 Only |
|                       | Change Description: Renamed 3.7.11.F             |                     |
| Action 3.7.11.E Bases | CREACS   | NUREG(s)- 1432 Only |
|                       | Change Description: Renamed 3.7.11.F             |                     |
| LCO 3.7.13            | ECCS PREACS                                      | NUREG(s)- 1432 Only |
| LCO 3.7.13 Bases      | ECCS PREACS                                      | NUREG(s)- 1432 Only |
| Action 3.7.13.B       | ECCS PREACS                                      | NUREG(s)- 1432 Only |
|                       | Change Description: Renamed 3.7.13.C             |                     |
| Action 3.7.13.B       | ECCS PREACS                                      | NUREG(s)- 1432 Only |
|                       | Change Description: New Condition                |                     |
| Action 3.7.13.B Bases | ECCS PREACS                                      | NUREG(s)- 1432 Only |
|                       | Change Description: Renamed 3.7.13.C and Revised |                     |
| Action 3.7.13.B Bases | ECCS PREACS                                      | NUREG(s)- 1432 Only |
|                       | Change Description: New Condition                |                     |
| LCO 3.7.14            | FBACS  | NUREG(s)- 1432 Only |
| LCO 3.7.14 Bases      | FBACS  | NUREG(s)- 1432 Only |
| Action 3.7.14.B       | FBACS  | NUREG(s)- 1432 Only |
|                       | Change Description: New Condition                |                     |
| Action 3.7.14.B       | FBACS  | NUREG(s)- 1432 Only |
|                       | Change Description: Renamed 3.7.14.C and Revised |                     |
| Action 3.7.14.B Bases | FBACS  | NUREG(s)- 1432 Only |
|                       | Change Description: Renamed 3.7.14.C and Revised |                     |
| Action 3.7.14.B Bases | FBACS  | NUREG(s)- 1432 Only |
|                       | Change Description: New Condition                |                     |
| Action 3.7.14.C       | FBACS  | NUREG(s)- 1432 Only |
|                       | Change Description: Renamed 3.7.14.D             |                     |

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|                       |                     |                                |                     |
|-----------------------|---------------------|--------------------------------|---------------------|
| Action 3.7.14.C Bases | FBACS               |                                | NUREG(s)- 1432 Only |
|                       | Change Description: | Renamed 3.7.14.D               |                     |
| Action 3.7.14.D       | FBACS               |                                | NUREG(s)- 1432 Only |
|                       | Change Description: | Renamed 3.7.14.E               |                     |
| Action 3.7.14.D Bases | FBACS               |                                | NUREG(s)- 1432 Only |
|                       | Change Description: | Renamed 3.7.14.E               |                     |
| LCO 3.7.15            | PREACS              |                                | NUREG(s)- 1432 Only |
| LCO 3.7.15 Bases      | PREACS              |                                | NUREG(s)- 1432 Only |
| Action 3.7.15.B       | PREACS              |                                | NUREG(s)- 1432 Only |
|                       | Change Description: | Renamed 3.7.15.C               |                     |
| Action 3.7.15.B       | PREACS              |                                | NUREG(s)- 1432 Only |
|                       | Change Description: | New Condition                  |                     |
| Action 3.7.15.B Bases | PREACS              |                                | NUREG(s)- 1432 Only |
|                       | Change Description: | Renamed 3.7.15.C and Revised   |                     |
| Action 3.7.15.B Bases | PREACS              |                                | NUREG(s)- 1432 Only |
|                       | Change Description: | New Condition                  |                     |
| LCO 3.7.4             | [MCREC] System      |                                | NUREG(s)- 1433 Only |
| LCO 3.7.4 Bases       | [MCREC] System      |                                | NUREG(s)- 1433 Only |
| Action 3.7.4.B        | [MCREC] System      |                                | NUREG(s)- 1433 Only |
|                       | Change Description: | Renumbered 3.7.4.C and Revised |                     |
| Action 3.7.4.B        | [MCREC] System      |                                | NUREG(s)- 1433 Only |
|                       | Change Description: | New Condition                  |                     |
| Action 3.7.4.B Bases  | [MCREC] System      |                                | NUREG(s)- 1433 Only |
|                       | Change Description: | Renumbered 3.7.4.C and Revised |                     |
| Action 3.7.4.B Bases  | [MCREC] System      |                                | NUREG(s)- 1433 Only |
|                       | Change Description: | New Condition                  |                     |
| Action 3.7.4.C        | [MCREC] System      |                                | NUREG(s)- 1433 Only |
|                       | Change Description: | Renumbered 3.7.4.D             |                     |
| Action 3.7.4.C Bases  | [MCREC] System      |                                | NUREG(s)- 1433 Only |
|                       | Change Description: | Renumbered 3.7.4.D             |                     |
| Action 3.7.4.D        | [MCREC] System      |                                | NUREG(s)- 1433 Only |
|                       | Change Description: | Renumbered 3.7.4.E and Revised |                     |
| Action 3.7.4.D Bases  | [MCREC] System      |                                | NUREG(s)- 1433 Only |
|                       | Change Description: | Renumbered 3.7.4.E and Revised |                     |

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|                      |   |                     |
|----------------------|---|---------------------|
| Action 3.7.4.E       | [MCREC] System<br>Change Description: Renumbered 3.7.4.F            | NUREG(s)- 1433 Only |
| Action 3.7.4.E Bases | [MCREC] System<br>Change Description: Renumbered 3.7.4.F            | NUREG(s)- 1433 Only |
| LCO 3.7.3            | [CRFA] System   | NUREG(s)- 1434 Only |
| LCO 3.7.3 Bases      | [CRFA] System   | NUREG(s)- 1434 Only |
| Action 3.7.3.B       | [CRFA] System<br>Change Description: New Condition                  | NUREG(s)- 1434 Only |
| Action 3.7.3.B       | [CRFA] System<br>Change Description: Renumbered 3.7.3.C and Revised | NUREG(s)- 1434 Only |
| Action 3.7.3.B Bases | [CRFA] System<br>Change Description: New Condition                  | NUREG(s)- 1434 Only |
| Action 3.7.3.B Bases | [CRFA] System<br>Change Description: Renumbered 3.7.3.C and Revised | NUREG(s)- 1434 Only |
| Action 3.7.3.C       | [CRFA] System<br>Change Description: Renumbered 3.7.3.D             | NUREG(s)- 1434 Only |
| Action 3.7.3.C Bases | [CRFA] System<br>Change Description: Renumbered 3.7.3.D             | NUREG(s)- 1434 Only |
| Action 3.7.3.D       | [CRFA] System<br>Change Description: Renumbered 3.7.3.E             | NUREG(s)- 1434 Only |
| Action 3.7.3.D Bases | [CRFA] System<br>Change Description: Renumbered 3.7.3.E             | NUREG(s)- 1434 Only |
| Action 3.7.3.E       | [CRFA] System<br>Change Description: Renumbered 3.7.3.F             | NUREG(s)- 1434 Only |
| Action 3.7.3.E Bases | [CRFA] System<br>Change Description: Renumbered 3.7.3.F             | NUREG(s)- 1434 Only |

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INSERT  
LCO NOTE (BWO 3.7.10, CREVS)

----- NOTE -----

The control room boundary may be opened intermittently under administrative control.

-----

3.7 PLANT SYSTEMS

3.7.10 Control Room Emergency Ventilation System (CREVS)

LCO 3.7.10 Two CREVS trains shall be OPERABLE.

← INSERT LCO NOTE

APPLICABILITY: MODES 1, 2, 3, and 4, [5, and 6,].  
[During movement of irradiated fuel assemblies,].  
[During CORE ALTERATIONS].

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME   |
|---|--|---|
| A. One CREVS train inoperable.  | A.1 Restore CREVS train to OPERABLE status.  | 7 days  |
| <p><b>B.</b> Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.</p> <p><b>C</b></p> <p>or B</p> | <p><b>B.1</b> Be in MODE 3.</p> <p><b>C</b></p> <p>AND</p> <p><b>B.2</b> Be in MODE 5.</p> <p><b>C</b></p>   | <p>6 hours</p> <p>36 hours</p>  |
|   | <p><b>D.</b> Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies [, or during CORE ALTERATIONS].</p> <p><b>C</b></p> | <p><b>B.1</b> -----NOTE-----<br/>Place in emergency mode if automatic transfer to emergency mode inoperable.<br/>-----</p> <p>Place OPERABLE CREVS train in emergency mode.</p> <p>OR</p> |

**B.** Two CREVS trains inoperable due to inoperable control room boundary in MODES 1, 2, 3, and 4. **B.1** Restore control room boundary to OPERABLE status. 24 hours

**ACTIONS**

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME                       |
|---|--|---------------------------------------|
| <p>ⓓ [E] (continued)</p>  | <p>ⓓ.2.1 Suspend Core ALTERATIONS.</p> <p>AND</p> <p>ⓓ.2.2 Suspend movement of irradiated fuel assemblies.</p> | <p>Immediately</p> <p>Immediately</p> |
| <p>ⓔ [E] Two CREVS trains inoperable during movement of irradiated fuel assemblies [, or during CORE ALTERATIONS] <i>for reasons other than Condition B</i></p> | <p>ⓔ.1 Suspend movement of irradiated fuel assemblies.</p> <p>AND</p> <p>ⓔ.2 Suspend CORE ALTERATIONS.</p>     | <p>Immediately</p> <p>Immediately</p> |
| <p>ⓕ [F] Two CREVS trains inoperable during MODE 1, 2, 3, or 4.</p>   | <p>ⓕ.1 Enter LCO 3.0.3.</p>  | <p>Immediately</p>                    |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY      |
|--|----------------|
| <p>SR 3.7.10.1 Operate each CREVS train for [≥ 10 continuous hours with the heaters operating or (for system without heaters) ≥ 15 minutes].</p> | <p>31 days</p> |

(continued)



**INSERT**  
**LCO NOTE BASES (BWOG 3.7.10, CREVS)**

The LCO is modified by a Note allowing the control room boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for control room isolation is indicated.

INSERT 1 (BWO 3.7.10)B.1

[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have written procedures available describing compensatory measures to be taken in the event of an intentional or unintentional entry into Condition B.]

If the control room boundary is inoperable in MODES 1, 2, 3, and 4, the CREVS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE control room boundary within 24 hours. During the period that the control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the control room boundary.

BASES

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APPLICABLE  
SAFETY ANALYSES  
(continued)

The worst case single active failure of a CREVS component, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

For this unit, there are no sources of toxic gases or chemicals that could be released to affect control room habitability.

The CREVS satisfies Criterion 3 of the NRC Policy Statement.

LCO

Two independent and redundant CREVS trains are required to be OPERABLE to ensure that at least one is available if a single failure disables the other train. Total system failure could result in exceeding a dose of 5 rem to the control room operators in the event of a large radioactive release.

The CREVS is considered OPERABLE when the individual components necessary to control operator exposure are OPERABLE in both trains. A CREVS train is considered OPERABLE when the associated:

- a. Fan is OPERABLE;
- b. HEPA filter and charcoal absorber are not excessively restricting flow, and are capable of performing their filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

INSERT  
LCO NOTE  
BASES

In addition, the control room boundary, including the integrity of the walls, floors, ceilings, ductwork, and access doors, must be maintained within the assumptions of the design analysis.

APPLICABILITY

In MODES 1, 2, 3, and 4, the CREVS must be OPERABLE to ensure that the control room will remain habitable during and following a DBA.

(continued)

BASES

APPLICABILITY  
(continued)

During movement of irradiated fuel assemblies [and during CORE ALTERATIONS], the CREVS must be OPERABLE to cope with a release due to a fuel handling accident.

ACTIONS

A.1

With one CREVS train inoperable, action must be taken to restore OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CREVS train is adequate to perform the control room radiation protection function. However, the overall reliability is reduced because a failure in the OPERABLE CREVS train could result in loss of CREVS function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability.

INSERT 1 (BWOG) →

ⓐ ~~1.1~~ and ~~1.2~~ ⓐ

or control room boundary ↓

In MODE 1, 2, 3, or 4, if the inoperable CREVS train cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

ⓐ ~~1.1~~, ⓐ ~~1.2.1~~, and ⓐ ~~1.2.2~~

ⓐ [In MODE 5 or 6, or] during movement of irradiated fuel assemblies [, or during CORE ALTERATIONS], if the inoperable CREVS train cannot be restored to OPERABLE status within the required Completion Time, the OPERABLE CREVS train must immediately be placed in the emergency mode. This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure will be readily detected. Required Action ~~1.1~~ is modified by a Note indicating to place the system in the emergency mode if automatic transfer to emergency mode is inoperable.

(continued)

BASES

ACTIONS

Ⓟ 1.1, Ⓟ 2.1, and Ⓟ 2.2 (continued)

Ⓟ An alternative to Required Action Ⓟ 1.1 is to immediately suspend activities that could release radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

Ⓧ 1.1 [In MODE 5 or 6, or] during movement of irradiated fuel assemblies [, or during CORE ALTERATIONS], when two CREVS trains are inoperable, action must be taken immediately to suspend activities that could release radioactivity that could enter the control room. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

Ⓧ 1.1

for reasons other than an inoperable control room boundary (i.e., Condition B)

If both CREVS trains are inoperable in MODE 1, 2, 3, or 4, the CREVS may not be capable of performing the intended function and the unit is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not severe, testing each train once every month adequately checks this system. Monthly heater operations dry out any moisture that has accumulated in the charcoal because of humidity in the ambient air. [Systems with heaters must be operated for ≥ 10 continuous hours with the heaters energized. Systems without heaters need only be operated for ≥ 15 minutes to demonstrate the function of the system.] The 31 day Frequency is based on the known reliability of the equipment and the two train redundancy available.

(continued)

INSERT  
LCO NOTE (BWOG 3.7.12, EVS)

----- NOTE -----

The Auxiliary Building negative pressure area boundary may be opened intermittently under administrative control.

-----

3.7 PLANT SYSTEMS

3.7.12 Emergency Ventilation System (EVS)

LCO 3.7.12 Two EVS trains shall be OPERABLE.

← INSERT LCO NOTE

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

ACTIONS

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME         |
|---|---|-------------------------|
| A. One EVS train inoperable.  | A.1 Restore EVS train to OPERABLE status.   | 7 days                  |
| <input checked="" type="checkbox"/> Required Action and associated Completion Time not met. | <input checked="" type="checkbox"/> 1 Be in MODE 3.<br>AND<br><input checked="" type="checkbox"/> 2 Be in MODE 5. | 6 hours<br><br>36 hours |

B. Two EVS trains inoperable due to inoperable Auxiliary Building negative Pressure area boundary. B.1 Restore Auxiliary Building negative Pressure area boundary to OPERABLE Status. 24 hours

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE |   | FREQUENCY                     |
|--------------|---|-------------------------------|
| SR 3.7.12.1  | Operate each EVS train for [ $\geq$ 10 continuous hours with the heaters operating or (for systems without heaters) $\geq$ 15 minutes]. | 31 days                       |
| SR 3.7.12.2  | Perform required EVS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].                                 | In accordance with the [VFTP] |

(continued)

INSERT  
LCO NOTE BASES (BWOOG 3.7.12, EVS)

The LCO is modified by a Note allowing the Auxiliary Building negative pressure area boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for Auxiliary Building negative pressure area isolation is indicated.



INSERT 2 (BWOG 3.7.12)B.1

[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have written procedures available describing compensatory measures to be taken in the event of an intentional or unintentional entry into Condition B.]

If the Auxiliary Building negative pressure area boundary is inoperable, the EVS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE Auxiliary Building negative pressure area boundary within 24 hours. During the period that the Auxiliary Building negative pressure area boundary is inoperable, appropriate compensatory measures [consistent with the intent, as applicable, of GDC 19, 63, 64 and 10 CFR Part 100] should be utilized to protect plant personnel from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the Auxiliary Building negative pressure area boundary.

INSERT 2 (BWOG 3.7.12)B.1

[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have written procedures available describing compensatory measures to be taken in the event of an intentional or unintentional entry into Condition B.]

If the Auxiliary Building negative pressure area boundary is inoperable, the EVS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE Auxiliary Building negative pressure area boundary within 24 hours. During the period that the Auxiliary Building negative pressure area boundary is inoperable, appropriate compensatory measures [consistent with the intent, as applicable, of GDC 19, 63, 64 and 10 CFR Part 100,] should be utilized to protect plant personnel from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the Auxiliary Building negative pressure area boundary.

INSERT  
LCO NOTE (BWO 3.7.13, FSPVS)

----- NOTE -----

The fuel building boundary may be opened intermittently under administrative control.

-----

3.7 PLANT SYSTEMS

3.7.13 Fuel Storage Pool Ventilation System (FSPVS)

LCO 3.7.13 [Two] FSPVS trains shall be OPERABLE.

← INSERT LCO NOTE

APPLICABILITY: [MODES 1, 2, 3, and 4,]  
During movement of irradiated fuel assemblies in the fuel building.

ACTIONS

| CONDITION  | REQUIRED ACTION   | COMPLETION TIME                       |
|--|---|---------------------------------------|
| A. One FSPVS train inoperable.   | A.1 Restore FSPVS train to OPERABLE status.   | 7 days                                |
| <p><input checked="" type="checkbox"/> B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.</p> <p>OR</p> <p>Two FSPVs trains inoperable in MODE 1, 2, 3, or 4.</p> | <p><input checked="" type="checkbox"/> B.1 Be in MODE 3.</p> <p>AND</p> <p><input checked="" type="checkbox"/> B.2 Be in MODE 5.</p> <p>for reasons other than Condition B</p>  | <p>6 hours</p> <p>36 hours</p>        |
| <p><input checked="" type="checkbox"/> D. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the fuel building.</p>                        | <p><input checked="" type="checkbox"/> D.1 Place OPERABLE FSPVS train in operation.</p> <p>OR</p> <p><input checked="" type="checkbox"/> D.2 Suspend movement of irradiated fuel assemblies in the fuel building.</p> | <p>Immediately</p> <p>Immediately</p> |

B. Two FSPVS trains in operable due to inoperable fuel building boundary in MODES 1, 2, 3, and 4. B.1 Restore fuel building boundary to OPERABLE Status 24 hours (continued)

**ACTIONS (continued)**

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME    |
|---|---|--------------------|
| <p><b>E</b> Two FSPVS trains inoperable during movement of irradiated fuel assemblies in the fuel building.</p> | <p><b>Y.1</b> <b>E</b> Suspend movement of irradiated fuel assemblies in the fuel building.</p> | <p>Immediately</p> |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY                                    |
|---|--|
| <p>SR 3.7.13.1 Operate each FSPVS train for [<math>\geq 10</math> continuous hours with the heaters operating or (for systems without heaters) <math>\geq 15</math> minutes].</p>   | <p>31 days</p>                               |
| <p>SR 3.7.13.2 Perform required FSPVS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].</p>  | <p>In accordance with the [VFTP]</p>         |
| <p>SR 3.7.13.3 Verify each FSPVS train actuates on an actual or simulated actuation signal.</p>   | <p>[18] months</p>                           |
| <p>SR 3.7.13.4 Verify one FSPVS train can maintain a pressure <math>\leq</math> [ ] inches water gauge with respect to atmospheric pressure during the [post accident] mode of operation at a flow rate <math>\leq</math> [3000] cfm.</p> | <p>[18] months on a STAGGERED TEST BASIS</p> |

(continued)

**INSERT**  
**LCO NOTE BASES (BWOOG 3.7.13, FSPVS)**

The LCO is modified by a Note allowing the fuel building boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for fuel building isolation is indicated.

**INSERT 3 (BWOG 3.7.13)****B.1**

[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have written procedures available describing compensatory measures to be taken in the event of an intentional or unintentional entry into Condition B.]

If the fuel building boundary is inoperable in MODES 1, 2, 3, and 4, the FSPVS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE fuel building boundary within 24 hours. During the period that the fuel building boundary is inoperable, appropriate compensatory measures [consistent with the intent, as applicable, of GDC 19, 60, 61, 63, 64 and 10 CFR Part 100] should be utilized to protect plant personnel from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the fuel building boundary.

BASES

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BACKGROUND  
(continued)

because it may be used for normal as well as post accident, atmospheric cleanup functions.

APPLICABLE  
SAFETY ANALYSES

The FSPVS design basis is established by the consequences of the limiting Design Basis Accident (DBA), which is a fuel handling accident. The analysis of the fuel handling accident, given in Reference 3, assumes that a certain number of fuel rods in an assembly are damaged. The DBA analysis of the fuel handling accident assumes that only one train of the FSPVS is functional due to a single failure that disables the other train. The accident analysis accounts for the reduction in airborne radioactive material provided by the remaining one train of this filtration system. These assumptions and the analysis follow the guidance provided in Regulatory Guide 1.25 (Ref. 4).

The FSPVS satisfies Criterion 3 of the NRC Policy Statement.

LCO

[Two] independent and redundant trains of the FSPVS are required to be OPERABLE to ensure that at least one is available, assuming a single failure that disables the other train coincident with a loss of offsite power. Total system failure could result in the atmospheric release from the fuel handling area exceeding 10 CFR 100 (Ref. 5) limits in the event of a fuel handling accident.

The FSPVS is considered OPERABLE when the individual components necessary to control operator exposure in the fuel handling building are OPERABLE in both trains. An FSPVS train is considered OPERABLE when its associated:

1. Fan is OPERABLE;
2. HEPA filter and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration functions; and
3. [Heater, demister,] ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

INSERT  
LCO NOTE  
BASES →

(continued)



BASES (continued)

APPLICABILITY

In [MODES 1, 2, 3, and 4,] the FSPVS is required to be OPERABLE to provide fission product removal associated with ECCS leaks due to a loss of coolant accident (refer to LCO 3.7.12) for units that use this system as part of their EVSs.

During movement of irradiated fuel assemblies in the fuel handling area, the FSPVS is always required to be OPERABLE to mitigate the consequences of a fuel handling accident.

In MODES 5 and 6, the FSPVS is not required to be OPERABLE since the ECCS is not required to be OPERABLE.

ACTIONS

A.1

With one FSPVS train inoperable, action must be taken to restore OPERABLE status within 7 days. During this time period, the remaining OPERABLE train is adequate to perform the FSPVS function. However, the overall reliability is reduced because a single failure in the OPERABLE FSPVS train could result in a loss of FSPVS functioning. The 7 day Completion Time is based on the risk from an event occurring requiring the inoperable FSPVS train, and ability of the remaining FSPVS train to provide the required protection.

INSERT 3 (BWO) →

for reasons other than an inoperable fuel building boundary (i.e., Condition B)

B.1 and B.2

or B.1

In MODE 1, 2, 3, or 4, when Required Action A.1 cannot be completed within the associated Completion Time, or when both FSPVS trains are inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

D D  
B.1 and B.2

If the inoperable FSPVS train cannot be restored to OPERABLE status within the required Completion Time, during movement

(continued)

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BASES

ACTIONS

**D** **D**  
N.1 and N.2 (continued)

of irradiated fuel assemblies in the fuel handling area, the OPERABLE FSPVS train must be started immediately or fuel movement suspended. This action ensures that the remaining train is OPERABLE, that no undetected failures preventing system operation will occur, and that any active failures will be readily detected.

If the system is not placed in operation, this action requires suspension of fuel movement, which precludes a fuel handling accident. This action does not preclude the movement of fuel assemblies to a safe position.

**E**  
N.1

When two trains of the FSPVS are inoperable during movement of irradiated fuel assemblies in the fuel handling area, the unit must be placed in a condition in which the LCO does not apply. This LCO involves immediately suspending movement of irradiated fuel assemblies in the fuel handling area. This does not preclude the movement of fuel to a safe position.

SURVEILLANCE  
REQUIREMENTS

SR 3.7.13.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system. Monthly heater operation dries out any moisture accumulated in the charcoal from humidity in the ambient air. [Systems with heaters must be operated for  $\geq 10$  continuous hours with the heaters energized. Systems without heaters need only be operated for  $\geq 15$  minutes to demonstrate the function of the system.] The 31 day Frequency is based on the known reliability of the equipment and the two train redundancy available.

SR 3.7.13.2

This SR verifies that the required FSPVS testing is performed in accordance with the [Ventilation Filter Testing

(continued)

INSERT  
LCO NOTE (WOG 3.7.10, CREFS)

----- NOTE -----

The control room boundary may be opened intermittently under administrative control.

-----

3.7 PLANT SYSTEMS

3.7.10 Control Room Emergency Filtration System (CREFS)

LCO 3.7.10 Two CREFS trains shall be OPERABLE.

← INSERT LCO NOTE

APPLICABILITY: MODES 1, 2, 3, 4, [5, and 6,]  
During movement of irradiated fuel assemblies,  
[During CORE ALTERATIONS].

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME                    |
|---|--|------------------------------------|
| A. One CREFS train inoperable.  | A.1 Restore CREFS train to OPERABLE status.  | 7 days                             |
| B. Required Action and associated Completion Time of Condition A ← not met in MODE 1, 2, 3, or 4.<br><i>(or B)</i>  | C<br>B.1 Be in MODE 3.   | 6 hours                            |
|   | C<br>AND<br>C<br>B.2 Be in MODE 5.   | 36 hours                           |
| C.<br>D<br>Required Action and associated Completion Time of Condition A not met [in MODE 5 or 6, or] during movement of irradiated fuel assemblies [, or during CORE ALTERATIONS]. | C.1<br>D<br>-----NOTE-----<br>Place in toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable.<br>-----<br>Place OPERABLE CREFS train in emergency mode.<br><br>OR | Immediately<br><br><br>(continued) |

B. Two CREFS trains inoperable due to inoperable control room boundary in WOG STS MODES 1, 2, 3, and 4. B.1 Restore control room boundary to OPERABLE status. 24 hours

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**ACTIONS**

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME                       |
|---|---|---------------------------------------|
| <p><i>D</i> (continued)</p>   | <p><i>D</i> E.2.1 Suspend CORE ALTERATIONS.<br/><br/>AND<br/><i>D</i> E.2.[2] Suspend movement of irradiated fuel assemblies.</p> | <p>Immediately</p> <p>Immediately</p> |
| <p><i>E</i> B. Two CREFS trains inoperable [in MODE 5 or 6, or] during movement of irradiated fuel assemblies [, or during CORE ALTERATIONS].</p> | <p><i>E</i> B.1 Suspend CORE ALTERATIONS.<br/><br/>AND<br/><i>E</i> B.[2] Suspend movement of irradiated fuel assemblies.</p>     | <p>Immediately</p> <p>Immediately</p> |
| <p><i>F</i> E. Two CREFS trains inoperable in MODE 1, 2, 3, or 4.</p>   | <p><i>F</i> E.1 Enter LCO 3.0.3.<br/><br/><i>For reasons other than Condition B</i></p>   | <p>Immediately</p>                    |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY      |
|---|----------------|
| <p>SR 3.7.10.1 Operate each CREFS train for [≥ 10 continuous hours with the heaters operating or (for systems without heaters) ≥ 15 minutes].</p> | <p>31 days</p> |

(continued)

INSERT  
LCO NOTE BASES (WOG 3.7.10, CREFS)

The LCO is modified by a Note allowing the control room boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for control room isolation is indicated.

INSERT 1 (WOG 3.7.10)B.1

[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have written procedures available describing compensatory measures to be taken in the event of an intentional or unintentional entry into Condition B.]

If the control room boundary is inoperable in MODES 1, 2, 3, and 4, the CREFS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE control room boundary within 24 hours. During the period that the control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the control room boundary.

BASES

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APPLICABLE  
SAFETY ANALYSES  
(continued)

Loss of coolant accident, fission product release presented in the FSAR, Chapter [15] (Ref. 2).

The analysis of toxic gas releases demonstrates that the toxicity limits are not exceeded in the control room following a toxic chemical release, as presented in Reference 1.

The worst case single active failure of a component of the CREFS, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

The CREFS satisfies Criterion 3 of the NRC Policy Statement.

LCO

Two independent and redundant CREFS trains are required to be OPERABLE to ensure that at least one is available assuming a single failure disables the other train. Total system failure could result in exceeding a dose of 5 rem to the control room operator in the event of a large radioactive release.

The CREFS is considered OPERABLE when the individual components necessary to limit operator exposure are OPERABLE in both trains. A CREFS train is OPERABLE when the associated:

- a. Fan is OPERABLE;
- b. HEPA filters and charcoal adsorbers are not excessively restricting flow, and are capable of performing their filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

In addition, the control room boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors.

INSERT  
LCO NOTE  
BASES

APPLICABILITY

In MODES 1, 2, 3, 4, [5, and 6,] and during movement of irradiated fuel assemblies [and during CORE ALTERATIONS],

(continued)



BASES

APPLICABILITY  
(continued)

CREFS must be OPERABLE to control operator exposure during and following a DBA.

In [MODE 5 or 6], the CREFS is required to cope with the release from the rupture of an outside waste gas tank.

During movement of irradiated fuel assemblies [and CORE ALTERATIONS], the CREFS must be OPERABLE to cope with the release from a fuel handling accident.

ACTIONS

A.1

When one CREFS train is inoperable, action must be taken to restore OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CREFS train is adequate to perform the control room protection function. However, the overall reliability is reduced because a single failure in the OPERABLE CREFS train could result in loss of CREFS function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability.

INSERT  
1 (WOG)

C B.1 and C B.2

or control room boundary

In MODE 1, 2, 3, or 4, if the inoperable CREFS train cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE that minimizes accident risk. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

D E.1, D E.2.1, and D E.2.2

[In MODE 5 or 6, or] during movement of irradiated fuel assemblies [, or during CORE ALTERATIONS], if the inoperable CREFS train cannot be restored to OPERABLE status within the required Completion Time, action must be taken to immediately place the OPERABLE CREFS train in the emergency

(continued)

BASES

ACTIONS

D E.1, D E.2.1, and D E.2.2 (continued)

mode. This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure would be readily detected.

An alternative to Required Action D E.1 is to immediately suspend activities that could result in a release of radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk. This does not preclude the movement of fuel to a safe position.

Required Action D E.1 is modified by a Note indicating to place the system in the toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable.

E E.1 and E E.2

[In MODE 5 or 6, or] during movement of irradiated fuel assemblies [, or during CORE ALTERATIONS], with two CREFS trains inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity that might enter the control room. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

F E.1

*for reasons other than an inoperable control room boundary (i.e., Condition B),*

If both CREFS trains are inoperable in MODE 1, 2, 3, or 4, the CREFS may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe,

(continued)

INSERT  
LCO NOTE (WOG 3.7.12, ECCS PREACS)

----- NOTE -----

The ECCS pump room boundary may be opened intermittently under administrative control.

-----

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3.7 PLANT SYSTEMS

3.7.12 Emergency Core Cooling System (ECCS) Pump Room Exhaust Air Cleanup System (PREACS)

LCO 3.7.12 Two ECCS PREACS trains shall be OPERABLE.

← INSERT LCO NOTE

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

ACTIONS

| CONDITION   | REQUIRED ACTION                                   | COMPLETION TIME |
|---|---|-----------------|
| A. One ECCS PREACS train inoperable.  | A.1 Restore ECCS PREACS train to OPERABLE status. | 7 days          |
| B. Required Action and associated Completion Time not met.<br>C   | C<br>B.1 Be in MODE 3.                            | 6 hours         |
|   | AND<br>B.2 Be in MODE 5.<br>C                     | 36 hours        |
| <p>B. Two ECCS PREACS trains inoperable due to inoperable ECCS pump room boundary. B.1 Restore ECCS pump room boundary to OPERABLE status. 24 hours</p> |   |                 |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY |
|--|-----------|
| SR 3.7.12.1 Operate each ECCS PREACS train for [≥ 10 continuous hours with the heaters operating or (for systems without heaters) ≥ 15 minutes]. | 31 days   |

(continued)

**INSERT**  
**LCO NOTE BASES (WOG 3.7.12, ECCS PREACS)**

The LCO is modified by a Note allowing the ECCS pump room boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for ECCS pump room isolation is indicated.

INSERT 2 (WOG 3.7.12)B.1

[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have written procedures available describing compensatory measures to be taken in the event of an intentional or unintentional entry into Condition B.]

If the ECCS pump room boundary is inoperable, the ECCS PREACS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE ECCS pump room boundary within 24 hours. During the period that the ECCS pump room boundary is inoperable, appropriate compensatory measures [consistent with the intent, as applicable, of GDC 19, 60, 64 and 10 CFR Part 100] should be utilized to protect plant personnel from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the ECCS pump room boundary.

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**BASES**

---

**LCO**  
(continued)

- a. Fan is OPERABLE;
- b. HEPA filter and charcoal adsorbers are not excessively restricting flow, and are capable of performing their filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE and air circulation can be maintained.

INSERT  
LCO NOTE  
BASES

**APPLICABILITY**

In MODES 1, 2, 3, and 4, the ECCS PREACS is required to be OPERABLE consistent with the OPERABILITY requirements of the ECCS.

In MODE 5 or 6, the ECCS PREACS is not required to be OPERABLE since the ECCS is not required to be OPERABLE.

---

**ACTIONS**

A.1

With one ECCS PREACS train inoperable, action must be taken to restore OPERABLE status within 7 days. During this time, the remaining OPERABLE train is adequate to perform the ECCS PREACS function.

The 7 day Completion Time is appropriate because the risk contribution is less than that for the ECCS (72 hour Completion Time), and this system is not a direct support system for the ECCS. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability.

Concurrent failure of two ECCS PREACS trains would result in the loss of functional capability; therefore, LCO 3.0.3 must be entered immediately.

INSERT 2 (WOG)



or ECCS pump room boundary

If the ECCS PREACS train cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least

(continued)

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## BASES

## ACTIONS

C B.1 and C B.2 (continued)

MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE  
REQUIREMENTSSR 3.7.12.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not severe, testing each train once a month provides an adequate check on this system. Monthly heater operations dry out any moisture that may have accumulated in the charcoal from humidity in the ambient air. [Systems with heaters must be operated  $\geq 10$  continuous hours with the heaters energized. Systems without heaters need only be operated for  $\geq 15$  minutes to demonstrate the function of the system.] The 31 day Frequency is based on the known reliability of equipment and the two train redundancy available.

SR 3.7.12.2

This SR verifies that the required ECCS PREACS testing is performed in accordance with the [Ventilation Filter Testing Program (VFTP)]. The ECCS PREACS filter tests are in accordance with Reference 4. The [VFTP] includes testing HEPA filter performance, charcoal adsorbers efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specific test Frequencies and additional information are discussed in detail in the [VFTP].

SR 3.7.12.3

This SR verifies that each ECCS PREACS train starts and operates on an actual or simulated actuation signal. The [18] month Frequency is consistent with that specified in Reference 4.

(continued)



INSERT  
LCO NOTE (WOG 3.7.13, FBACS)

----- NOTE -----

The fuel building boundary may be opened intermittently under administrative control.

-----

3.7 PLANT SYSTEMS

3.7.13 Fuel Building Air Cleanup System (FBACS)

LCO 3.7.13 Two FBACS trains shall be OPERABLE.

← INSERT LCO NOTE

APPLICABILITY: [MODES 1, 2, 3, and 4,]  
During movement of irradiated fuel assemblies in the fuel building.

ACTIONS

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME                       |
|---|---|---------------------------------------|
| <p>A. One FBACS train inoperable.</p> <p>INSERT B →</p>   | <p>A.1 Restore FBACS train to OPERABLE status.</p>  | <p>7 days</p>                         |
| <p><u>C</u> B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4. <i>or B</i></p> <p>OR</p> <p>Two FBACS trains inoperable in MODE 1, 2, 3, or 4.</p> | <p><u>C</u> B.1 Be in MODE 3.</p> <p>AND</p> <p><u>C</u> B.2 Be in MODE 5.</p> <p><i>For reasons other than Condition B.</i></p>                                | <p>6 hours</p> <p>36 hours</p>        |
| <p><u>D</u> C. Required Action and associated Completion Time [of Condition A] not met during movement of irradiated fuel assemblies in the fuel building.</p>                                  | <p><u>D</u> C.1 Place OPERABLE FBACS train in operation.</p> <p>OR</p> <p><u>D</u> C.2 Suspend movement of irradiated fuel assemblies in the fuel building.</p> | <p>Immediately</p> <p>Immediately</p> |

(continued)

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|   |  |          |
|---|--|----------|
| B. Two FBACS trains inoperable due to inoperable fuel building boundary, in MODES 1, 2, 3, and 4. | B.1 Restore fuel building boundary to OPERABLE status. | 24 hours |
|---|--|----------|

ACTIONS (continued)

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME |
|--|--|-----------------|
| E.D. Two FBACS trains inoperable during movement of irradiated fuel assemblies in the fuel building. | E/D.1 Suspend movement of irradiated fuel assemblies in the fuel building. | Immediately     |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE  | FREQUENCY                             |
|---|---------------------------------------|
| SR 3.7.13.1 Operate each FBACS train for [≥ 10 continuous hours with the heaters operating or (for systems without heaters) ≥ 15 minutes].  | 31 days                               |
| SR 3.7.13.2 Perform required FBACS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].   | In accordance with the [VFTP]         |
| [ SR 3.7.13.3 Verify each FBACS train actuates on an actual or simulated actuation signal.  | [18] months ]                         |
| SR 3.7.13.4 Verify one FBACS train can maintain a pressure ≤ [-0.125] inches water gauge with respect to atmospheric pressure during the [post accident] mode of operation at a flow rate ≤ [20,000] cfm. | [18] months on a STAGGERED TEST BASIS |

(continued)

**INSERT**  
**LCO NOTE BASES (WOG 3.7.13, FBACS)**

The LCO is modified by a Note allowing the fuel building boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for fuel building isolation is indicated.

**INSERT 3 (WOG 3.7.13)****B.1**

**[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have guidance available describing compensatory measures to be taken in the event of an intentional and unintentional entry into Condition B.]**

**If the fuel building boundary is inoperable in MODES 1, 2, 3, and 4, the FBACS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE fuel building boundary within 24 hours. During the period that the fuel building boundary is inoperable, appropriate compensatory measures [consistent with the intent, as applicable, of GDC 19, 60, 61, 63, 64 and 10 CFR Part 100] should be utilized to protect plant personnel from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the fuel building boundary.**

BASES (continued)

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APPLICABLE  
SAFETY ANALYSES

The FBACS design basis is established by the consequences of the limiting Design Basis Accident (DBA), which is a fuel handling accident. The analysis of the fuel handling accident, given in Reference 3, assumes that all fuel rods in an assembly are damaged. The analysis of the LOCA assumes that radioactive materials leaked from the Emergency Core Cooling System (ECCS) are filtered and adsorbed by the FBACS. The DBA analysis of the fuel handling accident assumes that only one train of the FBACS is functional due to a single failure that disables the other train. The accident analysis accounts for the reduction in airborne radioactive material provided by the one remaining train of this filtration system. The amount of fission products available for release from the fuel handling building is determined for a fuel handling accident and for a LOCA. These assumptions and the analysis follow the guidance provided in Regulatory Guide 1.25 (Ref. 4).

The FBACS satisfies Criterion 3 of the NRC Policy Statement.

LCO

Two independent and redundant trains of the FBACS are required to be OPERABLE to ensure that at least one train is available, assuming a single failure that disables the other train, coincident with a loss of offsite power. Total system failure could result in the atmospheric release from the fuel handling building exceeding the 10 CFR 100 (Ref. 5) limits in the event of a fuel handling accident.

The FBACS is considered OPERABLE when the individual components necessary to control exposure in the fuel handling building are OPERABLE in both trains. An FBACS train is considered OPERABLE when its associated:

- a. Fan is OPERABLE;
- b. HEPA filter and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration function; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

INSERT  
LCO NOTE  
BASES



(continued)

BASES (continued)

APPLICABILITY

In MODE 1, 2, 3, or 4, the FBACS is required to be OPERABLE to provide fission product removal associated with ECCS leaks due to a LOCA and leakage from containment and annulus.

In MODE 5 or 6, the FBACS is not required to be OPERABLE since the ECCS is not required to be OPERABLE.

During movement of irradiated fuel in the fuel handling area, the FBACS is required to be OPERABLE to alleviate the consequences of a fuel handling accident.

ACTIONS

A.1

With one FBACS train inoperable, action must be taken to restore OPERABLE status within 7 days. During this period, the remaining OPERABLE train is adequate to perform the FBACS function. The 7 day Completion Time is based on the risk from an event occurring requiring the inoperable FBACS train, and the remaining FBACS train providing the required protection.

INSERT 3 (WOG)

<sup>(C)</sup> A.1 and <sup>(C)</sup> A.2

for reasons other than an inoperable fuel building boundary (i.e., Condition B)

or B.1

In MODE 1, 2, 3, or 4, when Required Action A.1 cannot be completed within the associated Completion Time, or when both FBACS trains are inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in MODE 3 within 6 hours, and in MODE 5 within 36 hours. The Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

<sup>(D)</sup> A.1 and <sup>(D)</sup> A.2

When Required Action A.1 cannot be completed within the required Completion Time, during movement of irradiated fuel assemblies in the fuel building, the OPERABLE FBACS train must be started immediately or fuel movement suspended. This action ensures that the remaining train is OPERABLE,

(continued)



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BASES

ACTIONS

(D) 3.1 and 3.2 (continued)

that no undetected failures preventing system operation will occur, and that any active failure will be readily detected.

If the system is not placed in operation, this action requires suspension of fuel movement, which precludes a fuel handling accident. This does not preclude the movement of fuel assemblies to a safe position.

(E) 3.1

When two trains of the FBACS are inoperable during movement of irradiated fuel assemblies in the fuel building, action must be taken to place the unit in a condition in which the LCO does not apply. Action must be taken immediately to suspend movement of irradiated fuel assemblies in the fuel building. This does not preclude the movement of fuel to a safe position.

SURVEILLANCE  
REQUIREMENTS

SR 3.7.13.1

Standby systems should be checked periodically to ensure that they function properly. As the environmental and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system.

Monthly heater operation dries out any moisture accumulated in the charcoal from humidity in the ambient air. [Systems with heaters must be operated for  $\geq 10$  continuous hours with the heaters energized. Systems without heaters need only be operated for  $\geq 15$  minutes to demonstrate the function of the system.] The 31 day Frequency is based on the known reliability of the equipment and the two train redundancy available.

SR 3.7.13.2

This SR verifies that the required FBACS testing is performed in accordance with the [Ventilation Filter Testing

(continued)

INSERT  
LCO NOTE(WOG 3.7.14, PREACS)

----- NOTE -----

The penetration room boundary may be opened intermittently under administrative control.

-----

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3.7 PLANT SYSTEMS

3.7.14 Penetration Room Exhaust Air Cleanup System (PREACS)

LCO 3.7.14 Two PREACS trains shall be OPERABLE.

← INSERT LCO NOTE

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

ACTIONS

| CONDITION   | REQUIRED ACTION                                 | COMPLETION TIME |
|---|---|-----------------|
| A. One PREACS train inoperable.                                 | A.1 Restore PREACS train to OPERABLE status.    | 7 days          |
| B. Required Action and associated Completion Time not met.<br>C | <sup>C</sup><br>B.1 Be in MODE 3.               | 6 hours         |
|   | <u>AND</u><br>B.2 Be in MODE 5.<br><sup>C</sup> | 36 hours        |

B. Two PREACS trains inoperable due to inoperable penetration room boundary. B.1 Restore penetration room boundary to OPERABLE status. 24 hours

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE  | FREQUENCY                     |
|---|-------------------------------|
| SR 3.7.14.1 Operate each PREACS train for [≥ 10 continuous hours with heaters operating or (for systems without heaters) ≥ 15 minutes]. | 31 days                       |
| SR 3.7.14.2 Perform required PREACS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].                  | In accordance with the [VFTP] |

(continued)

**INSERT**  
**LCO NOTE BASES (WOG 3.7.14, PREACS)**

The LCO is modified by a Note allowing the penetration room boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for penetration room isolation is indicated.

BASES (continued)

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APPLICABLE  
SAFETY ANALYSES

The PREACS design basis is established by the large break loss of coolant accident (LOCA). The system evaluation assumes a passive failure outside containment, such as valve packing leakage during a Design Basis Accident (DBA). In such a case, the system restricts the radioactive release to within the 10 CFR 100 (Ref. 4) limits, or the NRC staff approved licensing basis (e.g., a specified fraction of 10 CFR 100 limits). The analysis of the effects and consequences of a large break LOCA are presented in Reference 3.

Two types of system failures are considered in the accident analysis: a complete loss of function, and excessive LEAKAGE. Either type of failure may result in less efficient removal of any gaseous or particulate material released to the penetration room following a LOCA.

The PREACS satisfies Criterion 3 of the NRC Policy Statement.

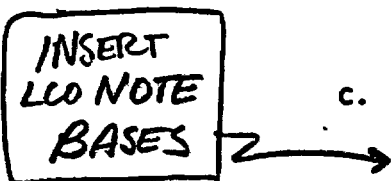
LCO

Two independent and redundant trains of the PREACS are required to be OPERABLE to ensure that at least one train is available, assuming there is a single failure disabling the other train coincident with a loss of offsite power.

The PREACS is considered OPERABLE when the individual components necessary to control radioactive releases are OPERABLE in both trains. A PREACS train is considered OPERABLE when its associated:

- a. Fan is OPERABLE;
- b. HEPA filter and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE and air circulation can be maintained.

INSERT  
LCO NOTE  
BASES



APPLICABILITY

In MODES 1, 2, 3, and 4, the PREACS is required to be OPERABLE, consistent with the OPERABILITY requirements of the Emergency Core Cooling System (ECCS).

(continued)

**BASES**

---

**APPLICABILITY**  
(continued)

In MODE 5 or 6, the PREACS is not required to be OPERABLE since the ECCS is not required to be OPERABLE.

---

**ACTIONS**

A.1

With one PREACS train inoperable, the action must be taken to restore OPERABLE status within 7 days. During this period, the remaining OPERABLE train is adequate to perform the PREACS function. The 7 day Completion Time is appropriate because the risk contribution of the PREACS is less than that of the ECCS (72 hour Completion Time), and this system is not a direct support system for the ECCS. The 7 day Completion Time is based on the low probability of a DBA occurring during this period, and the remaining train providing the required capability.

INSERT  
4 (WOG)

ⓐ B.1 and B.2 ⓐ

or penetration room boundary

If the inoperable train cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

---

**SURVEILLANCE  
REQUIREMENTS**

SR 3.7.14.1

Standby systems should be checked periodically to ensure that they function properly. As the environmental and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system. Monthly heater operation dries out any moisture that may have accumulated in the charcoal as a result of humidity in the ambient air. [Systems with heaters must be operated for  $\geq 10$  continuous hours with the heaters energized. Systems without heaters need only be operated for  $\geq 15$  minutes to demonstrate the function of the system.] The 31 day Frequency is based on the known

(continued)

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INSERT  
LCO NOTE (CEOG 3.7.11, CREACS)

----- NOTE -----

The control room boundary may be opened intermittently under administrative control.

-----

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Rev 15

3.7 PLANT SYSTEMS

3.7.11 Control Room Emergency Air Cleanup System (CREACS)

LCO 3.7.11 Two CREACS trains shall be OPERABLE.

← INSERT LLD NOTE

APPLICABILITY: MODES 1, 2, 3, 4, [5, and 6,]  
During movement of irradiated fuel assemblies,  
[During CORE ALTERATIONS].

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| A. One CREACS train inoperable.   | A.1 Restore CREACS train to OPERABLE status.   | 7 days          |
| <input checked="" type="checkbox"/> Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.  | <input checked="" type="checkbox"/> 1 Be in MODE 3.  | 6 hours         |
|   | AND<br><input checked="" type="checkbox"/> 2 Be in MODE 5.   | 36 hours        |
| <input checked="" type="checkbox"/> Required Action and associated Completion Time of Condition A not met [in MODES 5 and 6, or] during movement of irradiated fuel assemblies[, or during CORE ALTERATIONS]. | <input checked="" type="checkbox"/> 1 -----NOTE-----<br>Place in toxic gas protection mode if automatic transfer to toxic gas mode inoperable.<br>-----<br>Place OPERABLE CREACS train in emergency radiation protection mode. | Immediately     |

B. Two CREACS trains inoperable due to inoperable control room boundary in CEQG STS MODES 1, 2, 3, and 4

B.1 Restore control room boundary to OPERABLE status.

24 hours

3.7-24



TSTF -287 RWB

ACTIONS

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME                    |
|--|--|------------------------------------|
| <p>(D) (continued)</p>   | <p>2.1 Suspend CORE ALTERATIONS.<br/>AND<br/>2.2 Suspend movement of irradiated fuel assemblies.</p> | <p>Immediately<br/>Immediately</p> |
| <p>(E) Two CREACS trains inoperable [in MODES 5 and 6, or] during movement of irradiated fuel assemblies [, or during CORE ALTERATIONS].<br/><i>for reasons other than Condition B</i></p> | <p>2.1 Suspend CORE ALTERATIONS.<br/>AND<br/>2.2 Suspend movement of irradiated fuel assemblies.</p> | <p>Immediately<br/>Immediately</p> |
| <p>(F) Two CREACS trains inoperable in MODE 1, 2, 3, or 4.</p>   | <p>1 Enter LCO 3.0.3.</p>  | <p>Immediately</p>                 |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY      |
|--|----------------|
| <p>SR 3.7.11.1 Operate each CREACS train for [≥ 10 continuous hours with heaters operating or (for systems without heaters) ≥ 15 minutes].</p> | <p>31 days</p> |

(continued)

**INSERT**  
**LCO NOTE BASES (CEOG 3.7.11, CREACS)**

The LCO is modified by a Note allowing the control room boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for control room isolation is indicated.

**INSERT 1 (CEOG 3.7.11)****B.1**

**[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have written procedures available describing compensatory measures to be taken in the event of an intentional or unintentional entry into Condition B.]**

**If the control room boundary is inoperable in MODES 1, 2, 3, and 4, the CREACS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE control room boundary within 24 hours. During the period that the control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the control room boundary.**

BASES

TSTF-287 Rev. B

APPLICABLE  
SAFETY ANALYSES  
(continued)

accident dose analyses for the most limiting design basis loss of coolant accident fission product release presented in the FSAR, Chapter [15] (Ref. 2).

The analysis of toxic gas releases demonstrates that the toxicity limits are not exceeded in the control room following a toxic chemical release, as presented in Reference 1.

The worst case single active failure of a component of the CREACS, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

The CREACS satisfies Criterion 3 of the NRC Policy Statement.

LCO

Two independent and redundant trains of the CREACS are required to be OPERABLE to ensure that at least one is available, assuming that a single failure disables the other train. Total system failure could result in a control room operator receiving a dose in excess of 5 rem in the event of a large radioactive release.

The CREACS is considered OPERABLE when the individual components necessary to control operator exposure are OPERABLE in both trains. A CREACS train is considered OPERABLE when the associated:

- a. Fan is OPERABLE;
- b. HEPA filters and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

In addition, the control room boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors.

INSERT  
LLO NOTE  
BASES →

(continued)

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BASES (continued)

APPLICABILITY

In MODES 1, 2, 3, and 4, the CREACS must be OPERABLE to limit operator exposure during and following a DBA.

In MODES [5 and 6], the CREACS is required to cope with the release from a rupture of an outside waste gas tank.

During movement of irradiated fuel assemblies [and CORE ALTERATIONS], the CREACS must be OPERABLE to cope with the release from a fuel handling accident.

ACTIONS

A.1

With one CREACS train inoperable, action must be taken to restore OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CREACS subsystem is adequate to perform control room radiation protection function. However, the overall reliability is reduced because a single failure in the OPERABLE CREACS train could result in loss of CREACS function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and the ability of the remaining train to provide the required capability.

INSERT  
1 (CEOG)

(C) - 1.1 and 1.2 (C)

or control room boundary

associated

If the inoperable CREACS cannot be restored to OPERABLE status within the ~~required~~ Completion Time in MODE 1, 2, 3, or 4, the unit must be placed in a MODE that minimizes the accident risk. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

(D) - 1.1, 2.1, and 2.2 (D)

Required Action 1.1 is modified by a Note indicating to place the system in the emergency radiation protection mode if the automatic transfer to emergency mode is inoperable.

(continued)

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Rev 5

BASES

ACTIONS

Q.1., Q.2.1., and Q.2.2 (continued)

In MODE 5 or 6, or during movement of irradiated fuel assemblies [, or during CORE ALTERATIONS], if Required Action A.1 cannot be completed within the required Completion Time, the OPERABLE CREACS train must be immediately placed in the emergency mode of operation. This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure will be readily detected.

An alternative to Required Action Q.1 is to immediately suspend activities that could result in a release of radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel assemblies to a safe position.

E E  
Q.1 and Q.2

When [in MODES 5 and 6, or] during movement of irradiated fuel assemblies [, or during CORE ALTERATIONS], with two CREACS trains inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity that might enter the control room. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

F  
Q.1

for reasons other than an inoperable control room boundary (i.e., Condition B)

If both CREACS trains are inoperable in MODE 1, 2, 3, or 4, the CREACS may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE  
REQUIREMENTS

SR 3.7.11.1

Standby systems should be checked periodically to ensure that they function properly. Since the environment and normal operating conditions on this system are not severe,

(continued)

INSERT  
LCO NOTE (CEOG 3.7.13, ECCS PREACS)

----- NOTE -----

The ECCS pump room boundary may be opened intermittently under administrative control.

-----

TSTF-287 Rev 5

3.7 PLANT SYSTEMS

3.7.13 Emergency Core Cooling System (ECCS) Pump Room Exhaust Air Cleanup System (PREACS)

LCO 3.7.13 Two ECCS PREACS trains shall be OPERABLE.

← INSERT LCO NOTE

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

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| A. One ECCS PREACS train inoperable.  | A.1 Restore ECCS PREACS train to OPERABLE status.          | 7 days          |
| <input checked="" type="checkbox"/> Required Action and associated Completion Time not met. | <input checked="" type="checkbox"/> 1 Be in MODE 3.        | 6 hours         |
|   | AND<br><input checked="" type="checkbox"/> 2 Be in MODE 5. | 36 hours        |
| B. Two ECCS PREACS trains inoperable due to inoperable ECCS pump room boundary.             | B.1 Restore ECCS pump room boundary to OPERABLE status.    | 24 hours        |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE  | FREQUENCY |
|---|-----------|
| SR 3.7.13.1 Operate each ECCS PREACS train for [≥ 10 continuous hours with the heater operating or (for systems without heaters) ≥ 15 minutes]. | 31 days   |

(continued)



**INSERT**  
**LCO NOTE BASES (CEOG 3.7.13, ECCS PREACS)**

The LCO is modified by a Note allowing the ECCS pump room boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for ECCS pump room isolation is indicated.

INSERT 2 (CEOG 3.7.13)B.1

[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have guidance available describing compensatory measures to be taken in the event of an intentional and unintentional entry into Condition B.]

If the ECCS pump room boundary is inoperable, the ECCS PREACS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE ECCS pump room boundary within 24 hours. During the period that the ECCS pump room boundary is inoperable, appropriate compensatory measures [consistent with the intent, as applicable, of GDC 19, 60, 64 and 10 CFR Part 100] should be utilized to protect plant personnel from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the ECCS pump room boundary.

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Rev 5

BASES

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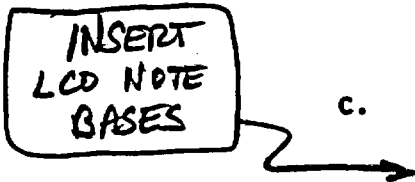
LCO  
(continued)

ECCS PREACS is considered OPERABLE when the individual components necessary to maintain the ECCS Pump Room filtration are OPERABLE in both trains.

An ECCS PREACS train is considered OPERABLE when its associated:

- a. Fan is OPERABLE;
- b. HEPA filter and charcoal adsorber are not excessively restricting flow and are capable of performing their filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

INSERT  
LCO NOTE  
BASES



---

APPLICABILITY

In MODES 1, 2, 3, and 4, the ECCS PREACS is required to be OPERABLE consistent with the OPERABILITY requirements of the ECCS.

In MODES 5 and 6, the ECCS PREACS is not required to be OPERABLE, since the ECCS is not required to be OPERABLE.

---

ACTIONS

A.1

With one ECCS PREACS train inoperable, action must be taken to restore OPERABLE status within 7 days. During this time, the remaining OPERABLE train is adequate to perform the ECCS PREACS function.

The 7 day Completion Time is appropriate because the risk contribution is less than that for the ECCS (72 hour Completion Time) and this system is not a direct support system for the ECCS. The 7 day Completion Time is reasonable, based on the low probability of a DBA occurring during this time period, and the consideration that the remaining train can provide the required capability.

INSERT  
2 (CEOG)



(continued)

---

BASES

ACTIONS  
(continued)

① 3.1 and 3.2

or ECCS pump room boundary

If the ECCS PREACS train cannot be restored to OPERABLE status within the associated Completion Time, the unit must be in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE  
REQUIREMENTS

SR 3.7.13.1

Standby systems should be checked periodically to ensure that they function properly. Since the environment and normal operating conditions on this system are not severe, testing each train once a month provides an adequate check on this system. Monthly heater operations dry out any moisture that may have accumulated in the charcoal from humidity in the ambient air. [Systems with heaters must be operated for  $\geq 10$  continuous hours with the heaters energized. Systems without heaters need only be operated for  $\geq 15$  minutes to demonstrate the function of the system.] The 31 day Frequency is based on the known reliability of equipment, and the two train redundancy available.

SR 3.7.13.2

This SR verifies that the required ECCS PREACS testing is performed in accordance with the [Ventilation Filter Testing Program (VFTP)]. The ECCS PREACS filter tests are in accordance with Regulatory Guide 1.52 (Ref. 4). The [VFTP] includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specific test frequencies and additional information are discussed in detail in the [VFTP].

(continued)

INSERT  
LCO NOTE (CEOG 3.7.14, FBACS)

----- NOTE -----

The fuel building boundary may be opened intermittently under administrative control.

-----

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3.7 PLANT SYSTEMS

3.7.14 Fuel Building Air Cleanup System (FBACS)

LCO 3.7.14 Two FBACS trains shall be OPERABLE.

← INSERT LCO NOTE

APPLICABILITY: [MODES 1, 2, 3, and 4,]  
During movement of irradiated fuel assemblies in the fuel building.

ACTIONS

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME                       |
|---|---|---------------------------------------|
| A. One FBACS train inoperable.  | A.1 Restore FBACS train to OPERABLE status.   | 7 days                                |
| <p>Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.</p> <p>OR</p> <p>Two FBACS trains inoperable in MODE 1, 2, 3, or 4.</p> | <p>1. Be in MODE 3.</p> <p>AND</p> <p>2. Be in MODE 5.</p>  | <p>6 hours</p> <p>36 hours</p>        |
| <p>Required Action and Associated Completion Time [of Condition A] not met during movement of irradiated fuel assemblies in the fuel building.</p>                      | <p>1. Place OPERABLE FBACS train in operation.</p> <p>OR</p> <p>2. Suspend movement of irradiated fuel assemblies in the fuel building.</p> | <p>Immediately</p> <p>Immediately</p> |

B. Two FBACS trains inoperable due to inoperable fuel building boundary in MODES 1, 2, 3, and 4  
CEOG STS

B.1 Restore fuel building boundary to OPERABLE Status.  
24 hours (continued)  
3.7-31

**ACTIONS (continued)**

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME    |
|---|---|--------------------|
| <p>Ⓜ. Two FBACS trains inoperable during movement of irradiated fuel assemblies in the fuel building.</p> | <p>Ⓜ.1 Suspend movement of irradiated fuel assemblies in the fuel building.</p> | <p>Immediately</p> |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY                                    |
|---|--|
| <p>SR 3.7.14.1 Operate each FBACS train for [≥ 10 continuous hours with the heaters operating or (for systems without heaters) ≥ 15 minutes].</p>   | <p>31 days</p>                               |
| <p>SR 3.7.14.2 Perform required FBACS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].</p>  | <p>In accordance with the [VFTP]</p>         |
| <p>SR 3.7.14.3 Verify each FBACS train actuates on an actual or simulated actuation signal.</p>   | <p>[18] months</p>                           |
| <p>SR 3.7.14.4 Verify one FBACS train can maintain a negative pressure ≥ [ ] inches water gauge with respect to atmospheric pressure, during the [post accident] mode of operation at a flow rate ≤ [3000] cfm.</p> | <p>[18] months on a STAGGERED TEST BASIS</p> |

(continued)

**INSERT**  
**LCO NOTE BASES (CEOG 3.7.14, FBACS)**

The LCO is modified by a Note allowing the fuel building boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for fuel building isolation is indicated.



**INSERT 3 (CEOG 3.7.14)****B.1**

**[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have guidance available describing compensatory measures to be taken in the event of an intentional and unintentional entry into Condition B.]**

**If the fuel building boundary is inoperable in MODES 1, 2, 3, and 4, the FBACS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE fuel building boundary within 24 hours. During the period that the fuel building boundary is inoperable, appropriate compensatory measures [consistent with the intent, as applicable, of GDC 19, 60, 61, 63, 64 and 10 CFR Part 100] should be utilized to protect plant personnel from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the fuel building boundary.**

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BASES (continued)

APPLICABLE  
SAFETY ANALYSES

The FBACS is designed to mitigate the consequences of a fuel handling accident in which [all] rods in the fuel assembly are assumed to be damaged. The analysis of the fuel handling accident is given in Reference 3. The Design Basis Accident analysis of the fuel handling accident assumes that only one train of the FBACS is functional, due to a single failure that disables the other train. The accident analysis accounts for the reduction in airborne radioactive material provided by the remaining one train of this filtration system. The amount of fission products available for release from the fuel handling building is determined for a fuel handling accident. These assumptions and the analysis follow the guidance provided in Regulatory Guide 1.25 (Ref. 4).

The FBACS satisfies Criterion 3 of the NRC Policy Statement.

LCO

Two independent and redundant trains of the FBACS are required to be OPERABLE to ensure that at least one is available, assuming a single failure that disables the other train coincident with a loss of offsite power. Total system failure could result in the atmospheric release from the fuel building exceeding the 10 CFR 100 limits (Ref. 5) in the event of a fuel handling accident.

The FBACS is considered OPERABLE when the individual components necessary to control exposure in the fuel handling building are OPERABLE in both trains. An FBACS train is considered OPERABLE when its associated:

- a. Fan is OPERABLE;
- b. HEPA filter and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

INSERT  
LCO NOTE  
BASES

APPLICABILITY

In MODES 1, 2, 3, and 4, the FBACS is required to be OPERABLE to provide fission product removal associated with ECCS leaks due to a LOCA (refer to LCO 3.7.13, "Emergency

(continued)

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BASES

APPLICABILITY  
(continued)

Core Cooling System (ECCS) Pump Room Exhaust Air Cleanup System (PREACS)\* for units that use this system as part of their ECCS PREACS.

During movement of irradiated fuel assemblies in the fuel building, the FBACS is required to be OPERABLE to mitigate the consequences of a fuel handling accident.

In MODES 5 and 6, the FBACS is not required to be OPERABLE, since the ECCS is not required to be OPERABLE.

ACTIONS

A.1

If one FBACS train is inoperable, action must be taken to restore OPERABLE status within 7 days. During this time period, the remaining OPERABLE train is adequate to perform the FBACS function. The 7 day Completion Time is reasonable, based on the risk from an event occurring requiring the inoperable FBACS train, and ability of the remaining FBACS train to provide the required protection.

INSERT  
3 (LEOG)

~~C~~ B.1 and B.2 ~~C~~

or B.1

for reasons other than an inoperable fuel building boundary (i.e., Condition B)

In MODE 1, 2, 3, or 4, when Required Action A.1 cannot be completed within the Completion Time, or when both FBACS trains are inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

~~D~~ 1 and ~~D~~ 2

When Required Action A.1 cannot be completed within the required Completion Time during movement of irradiated fuel in the fuel building, the OPERABLE FBACS train must be started immediately or fuel movement suspended. This action ensures that the remaining train is OPERABLE, that no undetected failures preventing system operation will occur, and that any active failure will be readily detected.

(continued)

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BASES



ACTIONS

D.1 and D.2 (continued)

If the system is not placed in operation, this action requires suspension of fuel movement, which precludes a fuel handling accident. This does not preclude the movement of fuel to a safe position.



When two trains of the FBACS are inoperable during movement of irradiated fuel assemblies in the fuel building, action must be taken to place the unit in a condition in which the LCO does not apply. This LCO involves immediately suspending movement of irradiated fuel assemblies in the fuel building. This does not preclude the movement of fuel to a safe position.

SURVEILLANCE  
REQUIREMENTS

SR 3.7.14.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system. Monthly heater operation dries out any moisture accumulated in the charcoal from humidity in the ambient air. [Systems with heaters must be operated for  $\geq 10$  continuous hours with the heaters energized. Systems without heaters need only be operated for  $\geq 15$  minutes to demonstrate the function of the system.] The 31 day Frequency is based on the known reliability of the equipment and the two train redundancy available.

SR 3.7.14.2

This SR verifies the performance of FBACS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)]. The FBACS filter tests are in accordance with the Regulatory Guide 1.52 (Ref. 6). The [VFTP] includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific

(continued)

INSERT  
LCO NOTE (CEOG 3.7.15, PREACS)

----- NOTE -----

The penetration room boundary may be opened intermittently under administrative control.

-----

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REV 5

3.7 PLANT SYSTEMS

3.7.15 Penetration Room Exhaust Air Cleanup System (PREACS)

LCO 3.7.15 Two PREACS trains shall be OPERABLE.

← INSERT LCO NOTE

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

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| A. One PREACS train inoperable.   | A.1 Restore PREACS train to OPERABLE status.               | 7 days          |
| <input checked="" type="checkbox"/> Required Action and associated Completion Time not met. | <input checked="" type="checkbox"/> 1 Be in MODE 3.        | 6 hours         |
|   | AND<br><input checked="" type="checkbox"/> 2 Be in MODE 5. | 36 hours        |

B. Two PREACS trains inoperable due to inoperable Penetration room boundary. B.1 Restore Penetration room boundary to OPERABLE status. 24 hours

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE   | FREQUENCY                     |
|--|-------------------------------|
| SR 3.7.15.1 Operate each PREACS train for [≥ 10 continuous hours with the heater operating or (for systems without heaters) ≥ 15 minutes]. | 31 days                       |
| SR 3.7.15.2 Verify required PREACS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].                      | In accordance with the [VFTP] |

(continued)

**INSERT**  
**LCO NOTE BASES (CEOG 3.7.15, PREACS)**

The LCO is modified by a Note allowing the penetration room boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for penetration room isolation is indicated.

INSERT 4 (CEOG 3.7.15)B.1

**[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have guidance available describing compensatory measures to be taken in the event of an intentional and unintentional entry into Condition B.]**

If the penetration room boundary is inoperable, the PREACS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE penetration room boundary within 24 hours. During the period that the penetration room boundary is inoperable, appropriate compensatory measures [consistent with the intent, as applicable, of GDC 19, 60, 64 and 10 CFR Part 100] should be utilized to protect plant personnel from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the penetration room boundary.



BASES

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BACKGROUND  
(continued)

consistent with iodine removal efficiencies, as discussed in the Regulatory Guide 1.52 (Ref. 4).

APPLICABLE  
SAFETY ANALYSES

The design basis of the PREACS is established by the large break loss of coolant accident (LOCA). The system evaluation assumes a passive failure outside containment, such as a valve packing leakage during a Design Basis Accident (DBA). In such a case, the system restricts the radioactive release to within 10 CFR 100 (Ref. 5) limits, or the NRC staff approved licensing basis (e.g., a specified fraction of 10 CFR 100 limits). The analysis of the effects and consequences of a large break LOCA are presented in Reference 3.

There are two types of system failures considered in the accident analysis: a complete loss of function and an excessive LEAKAGE. Either type of failure may result in less efficient removal for any gaseous or particulate material released to the penetration rooms following a LOCA.

The PREACS satisfies Criterion 3 of the NRC Policy Statement.

LCO

Two independent and redundant trains of the PREACS are required to be OPERABLE to ensure that at least one train is available, assuming there is a single failure disabling the other train coincident with a loss of offsite power.

The PREACS is considered OPERABLE when the individual components necessary to control radioactive releases are OPERABLE in both trains. A PREACS train is considered OPERABLE when its associated:

- a. Fan is OPERABLE;
- b. HEPA filter and charcoal adsorber are not excessively restricting flow, and are capable of performing the filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and circulation can be maintained.

INSERT  
LCD NOTE  
BASES



(continued)

BASES (continued)

APPLICABILITY

In MODES 1, 2, 3, and 4, the PREACS is required to be OPERABLE, consistent with the OPERABILITY requirements of the Emergency Core Cooling System (ECCS).

In MODES 5 and 6, the PREACS is not required to be OPERABLE, since the ECCS is not required to be OPERABLE.

ACTIONS

A.1

With one PREACS train inoperable, action must be taken to restore OPERABLE status within 7 days. During this time period, the remaining OPERABLE train is adequate to perform the PREACS function. The 7 day Completion Time is appropriate because the risk contribution of the PREACS is less than that for the ECCS (72 hour Completion Time), and because this system is not a direct support system for the ECCS. The 7 day Completion Time is reasonable, is based on the low probability of a DBA occurring during this time period, and the consideration that the remaining train can provide the required capability.

INSERT  
4 (CEOG)

① 3.1 and 3.2

PREACS

or penetration room boundary

If the inoperable train cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE  
REQUIREMENTS

SR 3.7.15.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system.

(continued)

INSERT  
LCO NOTE (BWR/4 3.7.4, MCREC System)

----- NOTE -----

The main control room boundary may be opened intermittently under administrative control.

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3.7 PLANT SYSTEMS

3.7.4 [Main Control Room Environmental Control (MCREC)] System

LCO 3.7.4 Two [MCREC] subsystems shall be OPERABLE.

← INSERT LCO NOTE

APPLICABILITY: MODES 1, 2, and 3,  
During movement of irradiated fuel assemblies in the  
[secondary] containment,  
During CORE ALTERATIONS,  
During operations with a potential for draining the reactor  
vessel (OPDRVs).

ACTIONS

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| A. One [MCREC] subsystem inoperable.  | A.1 Restore [MCREC] subsystem to OPERABLE status.          | 7 days          |
| <input checked="" type="checkbox"/> Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3. | <input checked="" type="checkbox"/> 1 Be in MODE 3.        | 12 hours        |
|   | AND<br><input checked="" type="checkbox"/> 2 Be in MODE 4. | 36 hours        |

(continued)

B. Two [MCREC] subsystems inoperable due to inoperable control room boundary in MODES 1, 2, and 3.

B.1 Restore control room boundary to OPERABLE status. 24 hours

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rw.5

ACTIONS (continued)

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME   |
|--|--|---|
| <p>Ⓢ. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the [secondary] containment, during CORE ALTERATIONS, or during OPDRVs.</p> | <p>-----NOTE-----<br/>LCO 3.0.3 is not applicable.<br/>-----NOTE-----</p> <p>Ⓢ.1<br/>Ⓢ Place in toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable.</p> <p>Place OPERABLE [MCREC] subsystem in [pressurization] mode.</p> <p>OR</p> <p>Ⓢ.2.1<br/>Ⓢ Suspend movement of irradiated fuel assemblies in the [secondary] containment.</p> <p>AND</p> <p>Ⓢ.2.2<br/>Ⓢ Suspend CORE ALTERATIONS.</p> <p>AND</p> <p>Ⓢ.2.3<br/>Ⓢ Initiate action to suspend OPDRVs.</p> | <p>Immediately</p> <p>Immediately</p> <p>Immediately</p> <p>Immediately</p> |
| <p>Ⓢ. Two [MCREC] subsystems inoperable in MODE 1, 2, or 3.</p>  | <p>Ⓢ.1<br/>Ⓢ Enter LCO 3.0.3.</p>  | <p>Immediately</p>  |

for reasons other than Condition B.

(continued)

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RWS

**ACTIONS (continued)**

| CONDITION  | REQUIRED ACTION  | COMPLETION TIME    |
|--|--|--------------------|
| <p> <input checked="" type="checkbox"/> E<br/> <input type="checkbox"/> F<br/>           Two [MCREC] subsystems inoperable during movement of irradiated fuel assemblies in the [secondary] containment, during CORE ALTERATIONS, or during OPDRVs.         </p> | <p>-----NOTE-----<br/>           LCO 3.0.3 is not applicable.<br/>           -----</p>   |                    |
|  | <p> <input checked="" type="checkbox"/> E<br/> <input type="checkbox"/> F<br/>           1 Suspend movement of irradiated fuel assemblies in the [secondary] containment.         </p> | <p>Immediately</p> |
|  | <p>           AND<br/> <input checked="" type="checkbox"/> E<br/> <input type="checkbox"/> F<br/>           2 Suspend CORE ALTERATIONS.         </p>                                   | <p>Immediately</p> |
|  | <p>           AND<br/> <input checked="" type="checkbox"/> E<br/> <input type="checkbox"/> F<br/>           3 Initiate action to suspend OPDRVs.         </p>                          | <p>Immediately</p> |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE   | FREQUENCY                            |
|--|--------------------------------------|
| <p>SR 3.7.4.1 Operate each [MCREC] subsystem for [<math>\geq</math> 10 continuous hours with the heaters operating or (for systems without heaters) <math>\geq</math> 15 minutes].</p> | <p>31 days</p>                       |
| <p>SR 3.7.4.2 Perform required [MCREC] filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].</p>  | <p>In accordance with the [VFTP]</p> |

(continued)

INSERT  
LCO NOTE BASES (BWR/4 3.7.4, MCREC System)

The LCO is modified by a Note allowing the main control room boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the main control room. This individual will have a method to rapidly close the opening when a need for main control room isolation is indicated.

INSERT 1 (BWR/4 3.7.4)B.1

[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have written procedures available describing compensatory measures to be taken in the event of an intentional or unintentional entry into Condition B.]

If the main control room boundary is inoperable in MODES 1, 2, and 3, the MCREC trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE main control room boundary within 24 hours. During the period that the main control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the main control room boundary.



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BASES

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BACKGROUND  
(continued)

room habitability is discussed in the FSAR, Chapters [6] and [9], (Refs. 1 and 2, respectively).

---

APPLICABLE  
SAFETY ANALYSES

The ability of the [MCREC] System to maintain the habitability of the control room is an explicit assumption for the safety analyses presented in the FSAR, Chapters [6] and [15] (Refs. 1 and 3, respectively). The pressurization mode of the [MCREC] System is assumed to operate following a loss of coolant accident, fuel handling accident, main steam line break, and control rod drop accident, as discussed in the FSAR, Section [6.4.1.2.2] (Ref. 4). The radiological doses to control room personnel as a result of the various DBAs are summarized in Reference 3. No single active or passive failure will cause the loss of outside or recirculated air from the control room.

The [MCREC] System satisfies Criterion 3 of the NRC Policy Statement.

---

LCO

Two redundant subsystems of the [MCREC] System are required to be OPERABLE to ensure that at least one is available, assuming a single failure disables the other subsystem. Total system failure could result in exceeding a dose of 5 rem to the control room operators in the event of a DBA.

The [MCREC] System is considered OPERABLE when the individual components necessary to control operator exposure are OPERABLE in both subsystems. A subsystem is considered OPERABLE when its associated:

- a. Fan is OPERABLE;
- b. HEPA filter and charcoal adsorbers are not excessively restricting flow and are capable of performing their filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

In addition, the control room boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors.

INSERT  
LCO NOTE  
BASES 2 →

(continued)

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BASES (continued)

APPLICABILITY

In MODES 1, 2, and 3, the [MCREC] System must be OPERABLE to control operator exposure during and following a DBA, since the DBA could lead to a fission product release.

In MODES 4 and 5, the probability and consequences of a DBA are reduced because of the pressure and temperature limitations in these MODES. Therefore, maintaining the [MCREC] System OPERABLE is not required in MODE 4 or 5, except for the following situations under which significant radioactive releases can be postulated:

- a. During operations with potential for draining the reactor vessel (OPDRVs);
- b. During CORE ALTERATIONS; and
- c. During movement of irradiated fuel assemblies in the [secondary] containment.

ACTIONS

A.1

With one [MCREC] subsystem inoperable, the inoperable [MCREC] subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining OPERABLE [MCREC] subsystem is adequate to perform control room radiation protection. However, the overall reliability is reduced because a single failure in the OPERABLE subsystem could result in reduced [MCREC] System capability. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and that the remaining subsystem can provide the required capabilities.

INSERT 1 (BWR4)

Ⓢ.1 and Ⓢ.2

or control room boundary

In MODE 1, 2, or 3, if the inoperable [MCREC] subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE that minimizes risk. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

(continued)

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BASES



ACTIONS  
(continued)

~~3.1.~~ ~~3.2.1.~~ ~~3.2.2.~~ and ~~3.2.3~~



The Required Actions of Condition ~~3~~ are modified by a Note indicating that LCO 3.0.3 does not apply. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

During movement of irradiated fuel assemblies in the [secondary] containment, during CORE ALTERATIONS, or during OPDRVs, if the inoperable [MCREC] subsystem cannot be restored to OPERABLE status within the required Completion Time, the OPERABLE [MCREC] subsystem may be placed in the pressurization mode. This action ensures that the remaining subsystem is OPERABLE, that no failures that would prevent automatic actuation will occur, and that any active failure will be readily detected.



Required Action ~~3.1~~ is modified by a Note alerting the operator to [place the system in the toxic gas protection mode if the toxic gas automatic transfer capability is inoperable].



An alternative to Required Action ~~3.1~~ is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

If applicable, CORE ALTERATIONS and movement of irradiated fuel assemblies in the [secondary] containment must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and the subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.



~~3.1~~

If both [MCREC] subsystems are inoperable in MODE 1, 2, or 3, the [MCREC] System may not be capable of performing

for reasons other than an inoperable control room boundary (i.e., Condition B)

(continued)

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Rev 15

BASES

(E)

ACTIONS

N.1 (continued)

the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

(F) (F) (F)  
N.1, N.2, and N.3

The Required Actions of Condition N are modified by a Note indicating that LCO 3.0.3 does not apply. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

During movement of irradiated fuel assemblies in the [secondary] containment, during CORE ALTERATIONS, or during OPDRVs, with two [MCREC] subsystems inoperable, action must be taken immediately to suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

If applicable, CORE ALTERATIONS and movement of irradiated fuel assemblies in the [secondary] containment must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. If applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

SURVEILLANCE  
REQUIREMENTS

SR 3.7.4.1

This SR verifies that a subsystem in a standby mode starts on demand and continues to operate. Standby systems should be checked periodically to ensure that they start and function properly. As the environmental and normal operating conditions of this system are not severe, testing each subsystem once every month provides an adequate check on this system. Monthly heater operation dries out any

(continued)

INSERT  
LCO NOTE (BWR/6 3.7.3, CRFA System)

----- NOTE -----

The control room boundary may be opened intermittently under administrative control.

-----

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3.7 PLANT SYSTEM

3.7.3 [Control Room Fresh Air (CRFA)] System

LCO 3.7.3 Two [CRFA] subsystems shall be OPERABLE.

← INSERT LCO NOTE

APPLICABILITY: MODES 1, 2, and 3,  
During movement of irradiated fuel assemblies in the  
[primary or secondary containment],  
During CORE ALTERATIONS,  
During operations with a potential for draining the reactor  
vessel (OPDRVs).

ACTIONS

| CONDITION   | REQUIRED ACTION                                  | COMPLETION TIME |
|---|--|-----------------|
| A. One [CRFA] subsystem inoperable.   | A.1 Restore [CRFA] subsystem to OPERABLE status. | 7 days          |
| Required Action and Associated Completion Time of Condition A not met in MODE 1, 2, or 3. | 1. Be in MODE 3.                                 | 12 hours        |
|   | AND<br>2. Be in MODE 4.                          | 36 hours        |

Required Action and Associated Completion Time of Condition A not met in MODE 1, 2, or 3.

B. Two [CRFA] subsystems inoperable due to inoperable control room boundary in MODES 1, 2, and 3,
   
 B.1 Restore control room boundary to OPERABLE status.
   
 24 hours

(continued)

ACTIONS (continued)

| CONDITION   | REQUIRED ACTION   | COMPLETION TIME   |
|---|---|---|
| <p><input checked="" type="checkbox"/> <b>D</b> Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the [primary or secondary containment], during CORE ALTERATIONS, or during OPDRVs.</p> | <p>-----NOTE-----<br/>LCO 3.0.3 is not applicable.<br/>-----</p> <p><input checked="" type="checkbox"/> <b>D</b>.1 <span style="border: 1px solid black; padding: 5px; display: inline-block;">-----NOTE-----<br/>Place in toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable.<br/>-----</span></p> <p>Place OPERABLE [CRFA] subsystem in [isolation] mode.</p> <p>OR</p> <p><input checked="" type="checkbox"/> <b>D</b>.2.1 Suspend movement of irradiated fuel assemblies in the [primary and secondary containment].</p> <p>AND</p> <p><input checked="" type="checkbox"/> <b>D</b>.2.2 Suspend CORE ALTERATIONS.</p> <p>AND</p> <p><input checked="" type="checkbox"/> <b>D</b>.2.3 Initiate action to suspend OPDRVs.</p> | <p>Immediately</p> <p>Immediately</p> <p>Immediately</p> <p>Immediately</p> |
| <p><input checked="" type="checkbox"/> <b>E</b> Two [CRFA] subsystems inoperable in MODE 1, 2, or 3.</p>  | <p><input checked="" type="checkbox"/> <b>E</b>.1 Enter LCO 3.0.3.</p>  | <p>Immediately</p>  |

for reasons other than Condition B

(continued)

**ACTIONS (continued)**

| CONDITION   | REQUIRED ACTION  | COMPLETION TIME |
|---|--|-----------------|
| <p>(F) Two [CRFA] subsystems inoperable during movement of irradiated fuel assemblies in the [primary or secondary containment], during CORE ALTERATIONS, or during OPDRVs.</p> | <p>-----NOTE-----<br/>                     LCO 3.0.3 is not applicable.<br/>                     -----</p> |                 |
|   | <p>(F) 1 Suspend movement of irradiated fuel assemblies in the [primary and secondary containment].</p>    | Immediately     |
|   | <p>AND<br/>                     (F) 2 Suspend CORE ALTERATIONS.</p>  | Immediately     |
|   | <p>AND<br/>                     (F) 3 Initiate action to suspend OPDRVs.</p>                               | Immediately     |

**SURVEILLANCE REQUIREMENTS**

| SURVEILLANCE  | FREQUENCY                     |
|---|-------------------------------|
| <p>SR 3.7.3.1 Operate each [CRFA] subsystem for [<math>\geq</math> 10 continuous hours with the heaters operating or (for systems without heaters) <math>\geq</math> 15 minutes].</p> | 31 days                       |
| <p>SR 3.7.3.2 Perform required [CRFA] filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].</p>  | In accordance with the [VFTP] |

(continued)



## INSERT

LCO NOTE BASES (BWR/6 3.7.3, CRFA System)

The LCO is modified by a Note allowing the control room boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for control room isolation is indicated.

INSERT 1 (BWR/6 3.7.3)B.1

[Reviewer's Note: Adoption of Condition B is dependent on a commitment from the licensee to have written procedures available describing compensatory measures to be taken in the event of an intentional or unintentional entry into Condition B.]

If the control room boundary is inoperable in MODES 1, 2, and 3, the CRFA trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE control room boundary within 24 hours. During the period that the control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the control room boundary.

BASES (continued)

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APPLICABLE  
SAFETY ANALYSES

The ability of the [CRFA] System to maintain the habitability of the control room is an explicit assumption for the safety analyses presented in the FSAR, Chapters [6] and [15] (Refs. 3 and 4, respectively). The isolation mode of the [CRFA] System is assumed to operate following a loss of coolant accident, main steam line break fuel handling accident, and control rod drop accident. The radiological doses to control room personnel as a result of the various DBAs are summarized in Reference 4. No single active or passive failure will cause the loss of outside or recirculated air from the control room.

The [CRFA] System satisfies Criterion 3 of the NRC Policy Statement.

LCO

Two redundant subsystems of the [CRFA] System are required to be OPERABLE to ensure that at least one is available, assuming a single failure disables the other subsystem. Total system failure could result in exceeding a dose of 5 rem to the control room operators in the event of a DBA.

The [CRFA] System is considered OPERABLE when the individual components necessary to control operator exposure are OPERABLE in both subsystems. A subsystem is considered OPERABLE when its associated:

- a. Fan is OPERABLE;
- b. HEPA filter and charcoal adsorber are not excessively restricting flow and are capable of performing their filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

In addition, the control room boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors.

INSERT  
LCO NOTE  
BASES

APPLICABILITY

In MODES 1, 2, and 3, the [CRFA] System must be OPERABLE to control operator exposure during and following a DBA, since the DBA could lead to a fission product release.

(continued)

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BASES

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APPLICABILITY  
(continued)

In MODES 4 and 5, the probability and consequences of a DBA are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining the [CRFA] System OPERABLE is not required in MODE 4 or 5, except for the following situations under which significant radioactive releases can be postulated:

- a. During operations with a potential for draining the reactor vessel (OPDRVs);
  - b. During CORE ALTERATIONS; and
  - c. During movement of irradiated fuel assemblies in the [primary or secondary containment].
- 

ACTIONS

A.1

With one [CRFA] subsystem inoperable, the inoperable [CRFA] subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining OPERABLE [CRFA] subsystem is adequate to perform control room radiation protection. However, the overall reliability is reduced because a single failure in the OPERABLE subsystem could result in loss of [CRFA] System function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and that the remaining subsystem can provide the required capabilities.

INSERT 1 (BWR6) →

Ⓢ B.1 and B.2 Ⓢ

Or control room boundary

In MODE 1, 2, or 3, if the inoperable [CRFA] subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE that minimizes risk. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

(continued)

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BASES

ACTIONS  
(continued)

① ① ① ①  
3.1, 3.2.1, 3.2.2, and 3.2.3

①  
The Required Actions of Condition 3 are modified by a Note indicating that LCO 3.0.3 does not apply. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

During movement of irradiated fuel assemblies in the [primary or secondary containment], during CORE ALTERATIONS, or during OPDRVs, if the inoperable [CRFA] subsystem cannot be restored to OPERABLE status within the required Completion Time, the OPERABLE [CRFA] subsystem may be placed in the isolation mode. This action ensures that the remaining subsystem is OPERABLE, that no failures that would prevent automatic actuation will occur, and that any active failure will be readily detected.

①  
Required Action 3.1 is modified by a Note alerting the operator to [place the system in the toxic gas protection mode if the toxic gas, automatic transfer capability is inoperable].

①  
An alternative to Required Action 3.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

If applicable, CORE ALTERATIONS and movement of irradiated fuel assemblies in the [primary and secondary containment] must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

(continued)

BASES

ACTIONS  
(continued)

(E) 3.1

for reasons other than an inoperable control room boundary (i.e., Condition B)

If both [CRFA] subsystems are inoperable in MODE 1, 2, or 3, the [CRFA] System may not be capable of performing the intended function and the unit is in a condition outside of the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

(F) 3.1, (E) 3.2, and (F) 3.3

The Required Actions of Condition 3 are modified by a Note indicating that LCO 3.0.3 does not apply. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

During movement of irradiated fuel assemblies in the [primary or secondary containment], during CORE ALTERATIONS, or during OPDRVs, with two [CRFA] subsystems inoperable, action must be taken immediately to suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

If applicable, CORE ALTERATIONS and movement of irradiated fuel assemblies in the [primary and secondary containment] must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. If applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

SURVEILLANCE  
REQUIREMENTS

SR 3.7.3.1

This SR verifies that a subsystem in a standby mode starts on demand and continues to operate. Standby systems should be checked periodically to ensure that they start and function properly. As the environmental and normal operating conditions of this system are not severe, testing

(continued)

## Industry/TSTF Standard Technical Specification Change Traveler

**Make changes to RTS and ESF Tables**

**Classification:** 1) Correct Specifications

**NUREGs Affected:**  1430  1431  1432  1433  1434

**Description:**

Modify Table 3.3.1-1, Reactor Trip System Instrumentation, and Table 3.3.2-1, Engineered Safety Feature Actuation Instrumentation, to replace the requirement for a Trip Setpoint with a requirement for a Nominal Trip Setpoint. Additionally, a note is added to the Bases which allows (1) the actual trip setpoint to be set more conservative than the Nominal Trip Setpoint specified in the ITS in response to plant conditions, and (2) states an "as-found" trip setpoint is operable when it is outside the calibration tolerance band if the as-found value has not exceeded the associated TS Allowable Value and the channel is readjusted to within the established calibration tolerances. The Bases discussion is revised to provide conforming discussion to the LCO changes and to more clearly and accurately discuss the relation between the nominal trip setpoint, the allowable value, and the plant approved setpoint methodology. Also, the Allowable Value is clarified to be the Limiting Safety System Setting required by 10 CFR 50.36.

Modify the Bases for the RPS Instrumentation specification for the BWO, CEOG, BWR/4 and BWR/6 ITS NUREGs to clearly document the basis for the use of allowable values rather than the trip setpoint as the Limiting Safety System Setting.

**Justification:**

This change clarifies the use of limiting safety system settings and standardizes the RTS and ESFAS TS Tables with other STS NUREGs.

|                          |                  |                |                         |
|--------------------------|------------------|----------------|-------------------------|
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### Revision History

#### OG Revision 0

**Revision Status: Closed**

Revision Proposed by: NRC

Revision Description:  
Original Issue

#### TSTF Review Information

TSTF Received Date: 21-May-99      Date Distributed for Review 21-May-99

OG Review Completed:  BWO  WOG  CEOG  BWROG

TSTF Comments:  
(No Comments)

TSTF Resolution: Superceeded Date: 28-Sep-99

#### OG Revision 1

**Revision Status: Active**

**Next Action: NRC**

Revision Proposed by: TSTF

Revision Description:  
Based on discussions with the NRC, changes have been made to TSB-20 and incorporated into TSTF-355.

1/11/00

**OG Revision 1****Revision Status: Active****Next Action: NRC**

The proposed Notes l and k (Inserts 1 and 2) added to Tables 3.3.1-1 and 3.3.2-1 have been moved to the LCO Bases. This presentation is preferable because a Reviewer's Note allows the trip setpoint column to be placed in the Bases or an owner controlled document. If this option is exercised by a licensee, it would be unclear where the Note should be placed. It is common practice in the ITS to provide detail on what constitutes OPERABILITY in the LCO Bases. By placing these Notes in the Bases, the information is located appropriately for either option. In addition, lengthy Notes are not typically included in the ITS Tables and placement of this OPERABILITY information in the Bases is consistent with the other ITS NUREGs.

A number of editorial and clarifying minor changes were made.

12/1/99 - NRC provided TSB-20, Rev. 1. TSB-20, Revision 1 is incorporated into this revision of TST-355.

**TSTF Review Information**

TSTF Received Date: 01-Dec-99                      Date Distributed for Review 01-Dec-99

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:

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**NRC Review Information**

NRC Received Date: 11-Jan-00

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Final Resolution: NRC Action Pending

Final Resolution Date:

**Incorporation Into the NUREGs**

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

**Affected Technical Specifications**

|                   |                                   |                     |
|-------------------|-----------------------------------|---------------------|
| Bkgnd 3.3.1 Bases | RTS Instrumentation               | NUREG(s)- 1430 Only |
| Bkgnd 3.3.1 Bases | RTS Instrumentation               | NUREG(s)- 1431 Only |
| S/A 3.3.1 Bases   | RTS Instrumentation               | NUREG(s)- 1431 Only |
| LCO 3.3.1         | RTS Instrumentation               | NUREG(s)- 1431 Only |
|                   | Change Description: Table 3.3.1-1 |                     |
| LCO 3.3.1 Bases   | RTS Instrumentation               | NUREG(s)- 1431 Only |
| Bkgnd 3.3.2 Bases | ESFAS Instrumentation             | NUREG(s)- 1431 Only |

1/11/00



|                     |  |                          |
|---------------------|--|--------------------------|
| S/A 3.3.2 Bases     | ESFAS Instrumentation                                      | NUREG(s)- 1431 Only      |
| LCO 3.3.2           | ESFAS Instrumentation<br>Change Description: Table 3.3.2-1 | NUREG(s)- 1431 Only      |
| LCO 3.3.2 Bases     | ESFAS Instrumentation                                      | NUREG(s)- 1431 Only      |
| Ref. 3.3.2 Bases    | ESFAS Instrumentation                                      | NUREG(s)- 1431 Only      |
| Bkgnd 3.3.1 Bases   | RTS Instrumentation (Analog)                               | NUREG(s)- 1432 Only      |
| Bkgnd 3.3.1 Bases   | RTS Instrumentation (Digital)                              | NUREG(s)- 1432 Only      |
| Bkgnd 3.3.1.1 Bases | RTS Instrumentation  | NUREG(s)- 1433 1434 Only |

1/11/00

**Reactor Trip System (RTS) Instrumentation, LCO 3.3.1 (NUREG-1431)**Insert 1

A channel is OPERABLE with a trip setpoint value outside its calibration tolerance band provided the trip setpoint "as-found" value does not exceed its associated Allowable Value and provided the trip setpoint "as-left" value is adjusted to a value within the "as-left" calibration tolerance band of the Nominal Trip Setpoint. A trip setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.

**Engineered Safety Feature Actuation System (ESFAS) Instrumentation, LCO 3.3.2 (NUREG-1431)**Insert 2

A channel is OPERABLE with a trip setpoint value outside its calibration tolerance band provided the trip setpoint "as-found" value does not exceed its associated Allowable Value and provided the trip setpoint "as-left" value is adjusted to a value within the calibration tolerance band of the Nominal Trip Setpoint. A trip setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.

**B 3.3.1 Reactor Trip System (RTS) Instrumentation BASES (NUREG-1431)**Insert 3

Technical specifications are required by IOCFR50.36 to contain LSSS defined by the regulation as "... settings for automatic protective devices . . . so chosen that automatic protective action will correct the abnormal situation before a Safety Limit (SL) is exceeded." The Analytic Limit is the limit of the process variable at which a safety action is initiated, as established by the safety analysis, to ensure that a SL is not exceeded. Any automatic protection action that occurs on reaching the Analytic Limit therefore ensures that the SL is not exceeded. However, in practice, the actual settings for automatic protective devices must be chosen to be more conservative than the Analytic Limit to account for instrument loop uncertainties related to the setting at which the automatic protective action would actually occur.

The Trip Setpoint is a predetermined setting for a protective device chosen to ensure automatic actuation prior to the process variable reaching the Analytic Limit and thus ensuring that the SL would not be exceeded. As such, the Trip Setpoint accounts for uncertainties in setting the device (e.g. calibration), uncertainties in how the device might actually perform (e.g., repeatability), changes in the point of action of the device over time (e.g., drift during surveillance intervals), and any other factors which may influence its actual performance (e.g., harsh accident

environments). In this manner, the Trip Setpoint plays an important role in ensuring that SLs are not exceeded. As such, the Trip Setpoint meets the definition of an LSSS (Ref. 10) and could be used to meet the requirement that they be contained in the technical specifications.

Technical specifications contain values related to the OPERABILITY of equipment required for safe operation of the facility. Operable is defined in technical specifications as "... being capable of performing its safety function(s)." For automatic protective devices, the required safety function is to ensure that a SL is not exceeded and therefore the LSSS as defined by 10 CFR 50.36 is the same as the OPERABILITY limit for these devices. However, use of the Trip Setpoint to define OPERABILITY in technical specifications and its corresponding designation as the LSSS required by 10 CFR 50.36 would be an overly restrictive requirement if it were applied as an OPERABILITY limit for the "as found" value of a protective device setting during a surveillance. This would result in technical specification compliance problems, as well as reports and corrective actions required by the rule which are not necessary to ensure safety. For example, an automatic protective device with a setting that has been found to be different from the Trip Setpoint due to some drift of the setting may still be OPERABLE since drift is to be expected. This expected drift would have been specifically accounted for in the setpoint methodology for calculating the Trip Setpoint and thus the automatic protective action would still have ensured that the SL would not be exceeded with the "as found" setting of the protective device. Therefore, the device would still be OPERABLE since it would have performed its safety function and the only corrective action required would be to reset the device to the Trip Setpoint to account for further drift during the next surveillance interval.

Use of the Trip Setpoint to define "as found" OPERABILITY and its designation as the LSSS under the expected circumstances described above would result in actions required by both the rule and technical specifications that are clearly not warranted. However, there is also some point beyond which the device would have not been able to perform its function due, for example, to greater than expected drift. This value needs to be specified in the technical specifications in order to define OPERABILITY of the devices and is designated as the Allowable Value which, as stated above, is the same as the LSSS.

The Allowable Value specified in Table 3.3.1-1 serves as the LSSS such that a channel is OPERABLE if the trip setpoint is found not to exceed the Allowable Value during the CHANNEL OPERATIONAL TEST (COT). As such, the Allowable Value differs from the Trip Setpoint by an amount primarily equal to the expected instrument loop uncertainties, such as drift, during the surveillance interval. In this manner, the actual setting of the device will still meet the LSSS definition and ensure that a Safety Limit is not exceeded at any given point of time as long as the device has not drifted beyond that expected during the surveillance interval. If the actual setting of the device is found to have exceeded the Allowable Value the device would be considered inoperable from a technical specification perspective. This requires corrective action including those actions required by 10 CFR 50.36 when automatic protective devices do

not function as required. Note that, although the channel is "OPERABLE" under these circumstances, the trip setpoint should be left adjusted to a value within the established trip setpoint calibration tolerance band, in accordance with uncertainty assumptions stated in the referenced setpoint methodology (as-left criteria), and confirmed to be operating within the statistical allowances of the uncertainty terms assigned.

[Note: Alternatively, a TS format incorporating an Allowable Value only column may be proposed by a licensee. In this case the trip setpoint value of Table 3.3.1-1 is located in the TS Bases or in a licensee-controlled document outside the TS. Changes to the trip setpoint value would be controlled by 10 CFR 50.59 or administratively as appropriate, and adjusted per the setpoint methodology and applicable surveillance requirements. At their option, the licensee may include the trip setpoint in Table 3.3.1-1 as shown, or as suggested by the licensees' setpoint methodology or license.]

### **B 3.3.1 Reactor Trip System (RTS) Instrumentation BASES (NUREG-1431)**

#### Insert 4

is determined by either "as-found" calibration data evaluated during the CHANNEL CALIBRATION or by qualitative assessment of field transmitter or sensor as related to the channel behavior observed during performance of the CHANNEL CHECK.

### **B 3.3.1 Reactor Trip System (RTS) Instrumentation BASES (NUREG-1431)**

#### Insert 5

which incorporates all of the known uncertainties applicable to each channel. The magnitudes of these uncertainties are factored into the determination of each trip setpoint and corresponding Allowable Value. The trip setpoint entered into the bistable is more conservative than that specified by the Allowable Value (LSSS) to account for measurement errors detectable by the COT. The Allowable Value serves as the Technical Specification OPERABILITY limit for the purpose of the COT. One example of such a change in measurement error is drift during the surveillance interval. If the measured setpoint does not exceed the Allowable Value, the bistable is considered OPERABLE.

The trip setpoint is the value at which the bistable is set and is the expected value to be achieved during calibration. The trip setpoint value ensures the LSSS and the safety analysis limits are met for surveillance interval selected when a channel is adjusted based on stated channel uncertainties. Any bistable is considered to be properly adjusted when the "as left" setpoint value is within the band for CHANNEL CALIBRATION uncertainty allowance' (i.e.,  $\pm$  rack calibration + comparator setting uncertainties). The trip setpoint value is therefore considered a

“nominal” value (i.e., expressed as a value without inequalities) for the purposes of COT and CHANNEL CALIBRATION.

### **B 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation BASES (NUREG-1431)**

#### Insert 6

The Allowable Value in conjunction with the trip setpoint and LCO establishes the threshold for ESFAS action to prevent exceeding acceptable limits such that the consequences of Design Basis Accidents (DBAs) will be acceptable. The Allowable Value is considered a limiting value such that a channel is OPERABLE if the setpoint is found not to exceed the Allowable Value during the CHANNEL OPERATIONAL TEST (COT). Note that, although a channel is “OPERABLE” under these circumstances, the ESFAS setpoint must be left adjusted to within the established calibration tolerance band of the ESFAS setpoint in accordance with the uncertainty assumptions stated in the referenced setpoint methodology, (as-left criteria) and confirmed to be operating within the statistical allowances of the uncertainty terms assigned.

### **B 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation BASES (NUREG-1431)**

#### Insert 7

is determined by either “as-found” calibration data evaluated during the CHANNEL CALIBRATION or by qualitative assessment of field transmitter or sensor, as related to the channel behavior observed during performance of the CHANNEL CHECK.

### **B 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation BASES (NUREG-1431)**

#### Insert 8

A detailed description of the methodology used to calculate the Allowable Value and ESFAS setpoints including their explicit uncertainties, is provided in the plant specific setpoint methodology study (Ref. 6) which incorporates all of the known uncertainties applicable to each channel. The magnitudes of these uncertainties are factored into the determination of each ESFAS setpoint and corresponding Allowable Value. The nominal ESFAS setpoint entered into the bistable is more conservative than that specified by the Allowable Value to account for measurement errors detectable by the COT. The Allowable Value serves as the Technical Specification OPERABILITY limit for the purpose of the COT. One example of such a change in measurement error is drift during the surveillance interval. If the measured setpoint does not

exceed the Allowable Value, the bistable is considered OPERABLE.

The ESFAS setpoints are the values at which the bistables are set and is the expected value to be achieved during calibration. The ESFAS setpoint value ensures the safety analysis limits are met for the surveillance interval selected when a channel is adjusted based on stated channel uncertainties. Any bistable is considered to be properly adjusted when the "as-left" setpoint value is within the band for CHANNEL CALIBRATION uncertainty allowance (i.e. calibration tolerance uncertainties). The ESFAS setpoint value is therefore considered a "nominal value (i.e., expressed as a value without inequalities) for the purposes of the COT and CHANNEL CALIBRATION.

**B 3.3.1 Reactor Protection System (RPS) Instrumentation BASES (NUREG-1430); B 3.3.1.1 Reactor Protection System (RPS) instrumentation BASES(NUREG-1433, NUREG-1434); B 3.3.1 Reactor Protective System (RPS) Instrumentation BASES (NUREG-1432)**

Insert 9

Technical specifications are required by IOCFR50.36 to contain LSSS defined by the regulation as "... settings for automatic protective devices . . . so chosen that automatic protective action will correct the abnormal situation before a Safety Limit (SL) is exceeded." The Analytic Limit is the limit of the process variable at which a safety action is initiated, as established by the safety analysis, to ensure that a SL is not exceeded. Any automatic protection action that occurs on reaching the Analytic Limit therefore ensures that the SL is not exceeded. However, in practice, the actual settings for automatic protective devices must be chosen to be more conservative than the Analytic Limit to account for instrument loop uncertainties related to the setting at which the automatic protective action would actually occur.

The Trip Setpoint is a predetermined setting for a protective device chosen to ensure automatic actuation prior to the process variable reaching the Analytic Limit and thus ensuring that the SL would not be exceeded. As such, the Trip Setpoint accounts for uncertainties in setting the device (e.g. calibration), uncertainties in how the device might actually perform (e.g., repeatability), changes in the point of action of the device over time (e.g., drift during surveillance intervals), and any other factors which may influence its actual performance (e.g., harsh accident environments). In this manner, the Trip Setpoint plays an important role in ensuring that SLs are not exceeded. As such, the Trip Setpoint meets the definition of an LSSS (Ref. 10) and could be used to meet the requirement that they be contained in the technical specifications.

Technical specifications contain values related to the OPERABILITY of equipment required for safe operation of the facility. Operable is defined in technical specifications as "... being capable of performing its safety function(s)." For automatic protective devices, the required safety

function is to ensure that a SL is not exceeded and therefore the LSSS as defined by 10 CFR 50.36 is the same as the OPERABILITY limit for these devices. However, use of the Trip Setpoint to define OPERABILITY in technical specifications and its corresponding designation as the LSSS required by 10 CFR 50.36 would be an overly restrictive requirement if it were applied as an OPERABILITY limit for the "as found" value of a protective device setting during a surveillance. This would result in technical specification compliance problems, as well as reports and corrective actions required by the rule which are not necessary to ensure safety. For example, an automatic protective device with a setting that has been found to be different from the Trip Setpoint due to some drift of the setting may still be OPERABLE since drift is to be expected. This expected drift would have been specifically accounted for in the setpoint methodology for calculating the Trip Setpoint and thus the automatic protective action would still have ensured that the SL would not be exceeded with the "as found" setting of the protective device. Therefore, the device would still be OPERABLE since it would have performed its safety function and the only corrective action required would be to reset the device to the Trip Setpoint to account for further drift during the next surveillance interval.

Use of the Trip Setpoint to define "as found" OPERABILITY and its designation as the LSSS under the expected circumstances described above would result in actions required by both the rule and technical specifications that are clearly not warranted. However, there is also some point beyond which the device would have not been able to perform its function due, for example, to greater than expected drift. This value needs to be specified in the technical specifications in order to define OPERABILITY of the devices and is designated as the Allowable Value which, as stated above, is the same as the LSSS.

The Allowable Value specified in Table 3.3.1-1 {Table 3.3.1.1-1 for NUREG-1433 and NUREG-1434} serves as the LSSS such that a channel is OPERABLE if the trip setpoint is found not to exceed the Allowable Value during the CHANNEL FUNCTIONAL TEST (CFT). As such, the Allowable Value differs from the Trip Setpoint by an amount primarily equal to the expected instrument loop uncertainties, such as drift, during the surveillance interval. In this manner, the actual setting of the device will still meet the LSSS definition and ensure that a Safety Limit is not exceeded at any given point of time as long as the device has not drifted beyond that expected during the surveillance interval. If the actual setting of the device is found to have exceeded the Allowable Value the device would be considered inoperable from a technical specification perspective. This requires corrective action including those actions required by 10 CFR 50.36 when automatic protective devices do not function as required. Note that, although the channel is "OPERABLE" under these circumstances, the trip setpoint should be left adjusted to a value within the established trip setpoint calibration tolerance band, in accordance with uncertainty assumptions stated in the referenced setpoint methodology (as-left criteria), and confirmed to be operating within the statistical allowances of the uncertainty terms assigned.

Table 3.3.1-1 (page 1 of 8)  
Reactor Trip System Instrumentation

| FUNCTION                           | APPLICABLE MODES<br>OR OTHER<br>SPECIFIED<br>CONDITIONS | REQUIRED<br>CHANNELS | CONDITIONS | SURVEILLANCE<br>REQUIREMENTS   | ALLOWABLE<br>VALUE                        | NOMINAL                                 |
|------------------------------------|---|----------------------|------------|--|---|---|
|                                    |   |                      |            |  |   | TRIP<br>SETPOINT (a)                    |
| 1. Manual Reactor Trip             | 1,2   | 2                    | B          | SR 3.3.1.14  | NA  | NA                                      |
|                                    | 3(b), 4(b), 5(b)  | 2                    | C          | SR 3.3.1.14  | NA  | NA                                      |
| 2. Power Range Neutron Flux        |   |                      |            |  |   |   |
| a. High                            | 1,2   | 4                    | D          | SR 3.3.1.1<br>SR 3.3.1.2<br>SR 3.3.1.7<br>SR 3.3.1.11<br>SR 3.3.1.16 | ≤ [111.2]X RTP                            | Ⓢ [109]X RTP                            |
| b. Low                             | 1(c),2  | 4                    | E          | SR 3.3.1.1<br>SR 3.3.1.8<br>SR 3.3.1.11<br>SR 3.3.1.16               | ≤ [27.2]X RTP                             | Ⓢ [25]X RTP                             |
| 3. Power Range Neutron Flux Rate   |   |                      |            |  |   |   |
| a. High Positive Rate              | 1,2   | 4                    | E          | SR 3.3.1.7<br>SR 3.3.1.11  | ≤ [6.8]X RTP with time constant ≥ [2] sec | Ⓢ [5]X RTP with time constant ≥ [2] sec |
| b. High Negative Rate              | 1,2   | 4                    | E          | SR 3.3.1.7<br>SR 3.3.1.11<br>SR 3.3.1.16                             | ≤ [6.8]X RTP with time constant ≥ [2] sec | Ⓢ [5]X RTP with time constant ≥ [2] sec |
| 4. Intermediate Range Neutron Flux | 1(c), 2(d)  | 2                    | F,G        | SR 3.3.1.1<br>SR 3.3.1.8<br>SR 3.3.1.11                              | ≤ [31]X RTP                               | Ⓢ [25]X RTP                             |
|                                    | 2(e)  | 2                    | H          | SR 3.3.1.1<br>SR 3.3.1.8<br>SR 3.3.1.11                              | ≤ [31]X RTP                               | Ⓢ [25]X RTP                             |

(continued)

- (a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
- (b) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.
- (c) Below the P-10 (Power Range Neutron Flux) interlocks.
- (d) Above the P-6 (Intermediate Range Neutron Flux) interlocks.
- (e) Below the P-6 (Intermediate Range Neutron Flux) interlocks.



Table 3.3.1-1 (page 2 of 8)  
 Reactor Trip System Instrumentation

| FUNCTION                     | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS  | ALLOWABLE VALUE               | <b>NOMINAL</b><br>TRIP SETPOINT (a) |
|------------------------------|--|-------------------|------------|--|-------------------------------|-------------------------------------|
| 5. Source Range Neutron Flux | 2(e)   | 2                 | I, J       | SR 3.3.1.1<br>SR 3.3.1.8<br>SR 3.3.1.11<br>SR 3.3.1.16                             | ≤ [1.4 ES]<br>cps             | Ⓢ [1.0 ES]<br>cps                   |
|                              | 3(b), 4(b), 5(b)                               | 2                 | J, K       | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.11<br>SR 3.3.1.16                             | ≤ [1.4 ES]<br>cps             | Ⓢ [1.0 ES]<br>cps                   |
|                              | 3(f), 4(f), 5(f)                               | [1]               | L          | SR 3.3.1.1<br>SR 3.3.1.11  | N/A                           | N/A                                 |
| 6. Overtemperature ΔT        | 1, 2   | [4]               | E          | SR 3.3.1.1<br>SR 3.3.1.3<br>SR 3.3.1.6<br>SR 3.3.1.7<br>SR 3.3.1.12<br>SR 3.3.1.16 | Refer to Note 1 (Page 3.3-21) | Refer to Note 1 (Page 3.3-21)       |
| 7. Overpower ΔT              | 1, 2   | [4]               | E          | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.12<br>SR 3.3.1.16                             | Refer to Note 2 (Page 3.3-22) | Refer to Note 2 (Page 3.3-22)       |

(continued)

- (a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
- (b) With RTBs closed and Rod Control System capable of rod withdrawal.
- (c) Below the P-6 (Intermediate Range Neutron Flux) interlocks.
- (f) With the RTBs open. In this condition, source range Function does not provide reactor trip but does provide [input to the Boron Dilution Protection System (LCO 3.3.9), and] indication.

Table 3.3.1-1 (page 3 of 8)  
 Reactor Trip System Instrumentation

| FUNCTION                          | APPLICABLE MODES<br>OR OTHER<br>SPECIFIED<br>CONDITIONS | REQUIRED<br>CHANNELS | CONDITIONS | SURVEILLANCE<br>REQUIREMENTS                           | ALLOWABLE<br>VALUE | <b>NOMINAL</b><br>TRIP<br>SETPOINT (a) |
|-----------------------------------|---|----------------------|------------|--|--------------------|--|
| 8. Pressurizer Pressure           |   |                      |            |  |                    |  |
| a. Low                            | 1(g)  | [4]                  | M          | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≥ [1886]<br>psig   | ② [1900]<br>psig                       |
| b. High                           | 1,2   | [4]                  | E          | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≤ [2396]<br>psig   | ② [2385]<br>psig                       |
| 9. Pressurizer Water Level - High | 1(g)  | 3                    | M          | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10                | ≤ [93.8]%          | ② [92]%                                |
| 10. Reactor Coolant Flow - Low    |   |                      |            |  |                    |  |
| a. Single Loop                    | 1(h)  | 3 per loop           | M          | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≥ [89.2]%          | ② [90]%                                |
| b. Two Loops                      | 1(i)  | 3 per loop           | M          | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≥ [89.2]%          | ② [90]%                                |

(continued)

- (a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
- (g) Above the P-7 (Low Power Reactor Trips Block) interlock.
- (h) Above the P-8 (Power Range Neutron Flux) interlock.
- (i) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.

Table 3.3.1-1 (page 4 of 8)  
Reactor Trip System Instrumentation

| FUNCTION  | APPLICABLE MODES<br>OR OTHER<br>SPECIFIED<br>CONDITIONS | REQUIRED<br>CHANNELS | CONDITIONS | SURVEILLANCE<br>REQUIREMENTS                           | ALLOWABLE<br>VALUE                     | <b>NOMINAL</b>                       |
|---|---|----------------------|------------|--|--|--------------------------------------|
|   |   |                      |            |  |  | TRIP-<br>SETPOINT <sup>(a)</sup>     |
| 11. Reactor Coolant Pump (RCP) Breaker Position     |   |                      |            |  |  |                                      |
| a. Single Loop                                      | 1(h)  | 1 per RCP            | O          | SR 3.3.1.14  | NA                                     | NA                                   |
| b. Two Loops  | 1(i)  | 1 per RCP            | N          | SR 3.3.1.14  | NA                                     | NA                                   |
| 12. Undervoltage RCPs                               | 1(g)  | [3] per bus          | M          | SR 3.3.1.9<br>SR 3.3.1.10<br>SR 3.3.1.16               | ≥ [4760] V                             | ② [4830] V                           |
| 13. Underfrequency RCPs                             | 1(g)  | [3] per bus          | M          | SR 3.3.1.9<br>SR 3.3.1.10<br>SR 3.3.1.16               | ≥ [57.1] Hz                            | ② [57.5] Hz                          |
| 14. Steam Generator (SG) Water Level - Low Low      | 1,2   | [4] per SG           | E          | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≥ [30.4]%                              | ② [32.3]%                            |
| 15. SG Water Level - Low                            | 1,2   | 2 per SG             | E          | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≥ [30.4]%                              | ② [32.3]%                            |
| Coincident with Steam Flow/ Feedwater Flow Mismatch | 1,2   | 2 per SG             | E          | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≤ [42.5]%<br>full steam<br>flow at RTP | ④ [40]%<br>full steam<br>flow at RTP |

(continued)

- (a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
- (g) Above the P-7 (Low Power Reactor Trips Block) interlock.
- (h) Above the P-8 (Power Range Neutron Flux) interlock.
- (i) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.

Table 3.3.1-1 (page 5 of 8)  
Reactor Trip System Instrumentation

| FUNCTION  | APPLICABLE MODES<br>OR OTHER<br>SPECIFIED<br>CONDITIONS | REQUIRED<br>CHANNELS | CONDITIONS | SURVEILLANCE<br>REQUIREMENTS               | ALLOWABLE<br>VALUE                | <b>NOMINAL</b><br>TRIP<br>SETPOINT <sup>(a)</sup> |
|---|---|----------------------|------------|--|-----------------------------------|---|
| 16. Turbine Trip  |   |                      |            |  |                                   |   |
| a. Low Fluid Oil Pressure   | 1(j)  | 3                    | P          | SR 3.3.1.10<br>SR 3.3.1.15                 | ≥ (750) psig                      | Ⓢ (800) psig                                      |
| b. Turbine Stop Valve Closure   | 1(j)  | 4                    | P          | SR 3.3.1.10<br>SR 3.3.1.15                 | ≥ (1)X open                       | Ⓢ (1)X open                                       |
| 17. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS) |   |                      |            |  |                                   |   |
|   | 1,2   | 2 trains             | Q          | SR 3.3.1.14                                | NA                                | NA  |
| 18. Reactor Trip System Interlocks  |   |                      |            |  |                                   |   |
| a. Intermediate Range Neutron Flux, P-6   | 2(e)  | 2                    | S          | SR 3.3.1.11<br>SR 3.3.1.13                 | ≥ (6E-11) amp                     | Ⓢ (1E-10) amp                                     |
| b. Low Power Reactor Trips Block, P-7   | 1   | 1 per train          | T          | SR 3.3.1.11<br>SR 3.3.1.13                 | NA                                | NA  |
| c. Power Range Neutron Flux, P-8  | 1   | 4                    | T          | SR 3.3.1.11<br>SR 3.3.1.13                 | ≤ (50.2)X RTP                     | Ⓢ (48)X RTP                                       |
| d. Power Range Neutron Flux, P-9  | 1   | 4                    | T          | SR 3.3.1.11<br>SR 3.3.1.13                 | ≤ (52.2)X RTP                     | Ⓢ (50)X RTP                                       |
| e. Power Range Neutron Flux, P-10   | 1,2   | 4                    | S          | SR 3.3.1.11<br>SR 3.3.1.13                 | ≥ (7.8)X RTP and<br>≤ (12.2)X RTP | Ⓢ (10)X RTP                                       |
| f. Turbine Impulse Pressure, P-13   | 1   | 2                    | T          | [SR 3.3.1.11<br>SR 3.3.1.10<br>SR 3.3.1.13 | ≤ (12.2)X turbine power           | Ⓢ (10)X turbine power                             |

(continued)

(a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.

(e) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(j) Above the P-9 (Power Range Neutron Flux) interlock.

Table 3.3.1-1 (page 6 of 8)  
 Reactor Trip System Instrumentation

| FUNCTION  | APPLICABLE MODES<br>OR OTHER<br>SPECIFIED<br>CONDITIONS | REQUIRED<br>CHANNELS | CONDITIONS | SURVEILLANCE<br>REQUIREMENTS | ALLOWABLE<br>VALUE | NOMINAL              |
|---|---|----------------------|------------|------------------------------|--------------------|----------------------|
|   |   |                      |            |                              |                    | TRIP<br>SETPOINT (a) |
| 19. Reactor Trip<br>Breakers (k)  | 1,2   | 2 trains             | R          | SR 3.3.1.4                   | NA                 | NA                   |
|   | 3(b), 4(b), 5(b)  | 2 trains             | C          | SR 3.3.1.4                   | NA                 | NA                   |
| 20. Reactor Trip<br>Breaker<br>Undervoltage and<br>Shunt Trip<br>Mechanisms | 1,2   | 1 each<br>per RTB    | U          | SR 3.3.1.4                   | NA                 | NA                   |
|   | 3(b), 4(b), 5(b)  | 1 each<br>per RTB    | C          | SR 3.3.1.4                   | NA                 | NA                   |
| 21. Automatic Trip<br>Logic   | 1,2   | 2 trains             | Q          | SR 3.3.1.5                   | NA                 | NA                   |
|   | 3(b), 4(b), 5(b)  | 2 trains             | C          | SR 3.3.1.5                   | NA                 | NA                   |

- (a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
- (b) With RTBs closed and Rod Control System capable of rod withdrawal.
- (k) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

Table 3.3.1-1 (page 7 of 8)  
 Reactor Trip System Instrumentation

Note 1: Overtemperature  $\Delta T$

Nominal

The Overtemperature  $\Delta T$  Function Allowable Value shall not exceed the following Trip Setpoint by more than [3.8]% of  $\Delta T$  span.

$$\Delta T \frac{(1+\tau_1 s)}{(1+\tau_2 s)} \left( \frac{1}{1+\tau_3 s} \right) \leq \Delta T_0 \left\{ K_1 - K_2 \frac{(1+\tau_4 s)}{(1+\tau_5 s)} \left[ T \frac{1}{(1+\tau_6 s)} - T' \right] + K_3 (P - P') - f_1(\Delta I) \right\}$$

Where:  $\Delta T$  is measured RCS  $\Delta T$ , °F.  
 $\Delta T_0$  is the indicated  $\Delta T$  at RTP, °F.  
 $s$  is the Laplace transform operator, sec<sup>-1</sup>.  
 $T$  is the measured RCS average temperature, °F.  
 $T'$  is the nominal  $T_{avg}$  at RTP,  $\leq$  [588]°F.

$P$  is the measured pressurizer pressure, psig  
 $P'$  is the nominal RCS operating pressure,  $\leq$  [2235] psig

$K_1 \leq$  [1.09]       $K_2 \geq$  [0.0138]/°F       $K_3 =$  [0.000671]/psig  
 $\tau_1 \geq$  [ 8 ] sec       $\tau_2 \leq$  [ 3 ] sec       $\tau_3 \leq$  [ 2 ] sec  
 $\tau_4 \geq$  [ 33 ] sec       $\tau_5 \leq$  [ 4 ] sec       $\tau_6 \leq$  [ 2 ] sec

$f_1(\Delta I) =$  1.26{35 + ( $q_t - q_b$ )} when  $q_t - q_b \leq -$  [35]% RTP  
 0% of RTP when  $-$ [35]% RTP  $< q_t - q_b \leq$  [7]% RTP  
 $-1.05\{(q_t - q_b) - 7\}$  when  $q_t - q_b >$  [7]% RTP

Where  $q_t$  and  $q_b$  are percent RTP in the upper and lower halves of the core, respectively, and  $q_t + q_b$  is the total THERMAL POWER in percent RTP.

Table 3.3.1-1 (page 8 of 8)  
 Reactor Trip System Instrumentation

Note 2: Overpower  $\Delta T$

Nominal

The Overpower  $\Delta T$  Function Allowable Value shall not exceed the following Trip Setpoint by more than [3]% of  $\Delta T$  span.

$$\Delta T \frac{(1+\tau_1 s)}{(1+\tau_2 s)} \left( \frac{1}{1+\tau_3 s} \right) \leq \Delta T_0 \left\{ K_4 - K_5 \frac{\tau_6 s}{1+\tau_7 s} \left( \frac{1}{1+\tau_8 s} \right) T - K_6 \left[ T \frac{1}{1+\tau_9 s} - T'' \right] - f_2(\Delta I) \right\}$$

Where:  $\Delta T$  is measured RCS  $\Delta T$ , °F.  
 $\Delta T_0$  is the indicated  $\Delta T$  at RTP, °F.  
 $s$  is the Laplace transform operator, sec<sup>-1</sup>.  
 $T$  is the measured RCS average temperature, °F.  
 $T''$  is the nominal  $T_{avg}$  at RTP,  $\leq$  [588]°F.

|                       |   |  |
|-----------------------|---|--|
| $K_4 \leq$ [1.09]     | $K_5 \geq$ [0.02]/°F for increasing $T_{avg}$ | $K_6 \geq$ [0.00128]/°F when $T > T''$ |
|                       | [0]/°F for decreasing $T_{avg}$               | [0]/°F when $T \leq T''$               |
| $\tau_1 \geq$ [8] sec | $\tau_2 \leq$ [3] sec                         | $\tau_3 \leq$ [2] sec                  |
| $\tau_6 \leq$ [2] sec | $\tau_7 \geq$ [10] sec                        |  |

$f_2(\Delta I) = 0\%$  RTP for all  $\Delta I$ .

Table 3.3.2-1 (page 2 of 8)  
Engineered Safety Feature Actuation System Instrumentation

| FUNCTION  | APPLICABLE<br>MODES OR<br>OTHER<br>SPECIFIED<br>CONDITIONS | REQUIRED<br>CHANNELS  | CONDITIONS | SURVEILLANCE<br>REQUIREMENTS                          | ALLOWABLE<br>VALUE          | TRIP<br>SETPOINT (a) |
|---|--|-----------------------|------------|---|-----------------------------|----------------------|
| <b>1. Safety Injection<br/>(continued)</b>        |  |                       |            |   |                             |                      |
| g. High Steam Flow in Two Steam Lines             | 1,2,3 <sup>(d)</sup>                                       | 2 per steam line      | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | (e)                         | (f)                  |
| Coincident with Steam Line Pressure - Low         | 1,2,3 <sup>(d)</sup>                                       | 1 per steam line      | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ [635] <sup>(c)</sup> psig | ② [675] psig         |
| <b>2. Containment Spray</b>                       |  |                       |            |   |                             |                      |
| a. Manual Initiation                              | 1,2,3,4  | 2 per train, 2 trains | B          | SR 3.3.2.8  | NA                          | NA                   |
| b. Automatic Actuation Logic and Actuation Relays | 1,2,3,4  | 2 trains              | C          | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6                | NA                          | NA                   |
| c. Containment Pressure                           |  |                       |            |   |                             |                      |
| High - 3 (High High)                              | 1,2,3  | 4                     | E          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ [12.31] psig              | ⑤ [12.05] psig       |
| High - 3 (Two Loop Plants)                        | 1,2,3  | [3] sets of [2]       | E          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ [12.31] psig              | ⑤ [12.05] psig       |

(continued)

- (a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
- (c) Time constants used in the lead/lag controller are  $t_1 \geq [50]$  seconds and  $t_2 \leq [5]$  seconds.
- (d) Above the P-12 ( $T_{avg}$  - Low Low) interlock.
- (e) Less than or equal to a function defined as  $\Delta P$  corresponding to [44]% full steam flow below [20]% load, and  $\Delta P$  increasing linearly from [44]% full steam flow at [20]% load to [114]% full steam flow at [100]% load, and  $\Delta P$  corresponding to [114]% full steam flow above 100% load.
- (f) Less than or equal to a function defined as  $\Delta P$  corresponding to [40]% full steam flow between [0]% and [20]% load and then a  $\Delta P$  increasing linearly from [40]% steam flow at [20]% load to [110]% full steam flow at [100]% load.



Table 3.3.2-1 (page 3 of 8)  
 Engineered Safety Feature Actuation System Instrumentation

| FUNCTION   | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS  | REQUIRED CHANNELS     | CONDITIONS | SURVEILLANCE REQUIREMENTS                             | ALLOWABLE VALUE | TRIP SETPOINT (a) |
|--|---|-----------------------|------------|---|-----------------|-------------------|
| <b>3. Containment Isolation</b>                    |   |                       |            |   |                 |                   |
| <b>a. Phase A Isolation</b>                        |   |                       |            |   |                 |                   |
| (1) Manual Initiation                              | 1,2,3,4   | 2                     | B          | SR 3.3.2.8  | NA              | NA                |
| (2) Automatic Actuation Logic and Actuation Relays | 1,2,3,4   | 2 trains              | C          | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6                | NA              | NA                |
| (3) Safety Injection                               | Refer to Function 1 (Safety Injection) for all initiation functions and requirements. |                       |            |   |                 |                   |
| <b>b. Phase B Isolation</b>                        |   |                       |            |   |                 |                   |
| (1) Manual Initiation                              | 1,2,3,4   | 2 per train, 2 trains | B          | SR 3.3.2.8  | NA              | NA                |
| (2) Automatic Actuation Logic and Actuation Relays | 1,2,3,4   | 2 trains              | C          | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6                | NA              | NA                |
| (3) Containment Pressure                           |   |                       |            |   |                 |                   |
| High-3 (High High)                                 | 1,2,3   | [4]                   | E          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ [12.31] psig  | [12.05] psig      |
| <b>4. Steam Line Isolation</b>                     |   |                       |            |   |                 |                   |
| a. Manual Initiation                               | 1,2 <sup>(i)</sup> ,3 <sup>(i)</sup>  | 2                     | F          | SR 3.3.2.8  | NA              | NA                |
| b. Automatic Actuation Logic and Actuation Relays  | 1,2 <sup>(i)</sup> ,3 <sup>(i)</sup>  | 2 trains              | G          | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6                | NA              | NA                |

NOMINAL

(continued)

(a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.  
 (i) Except when all MSIVs are closed and [de-activated].

Table 3.3.2-1 (page 4 of 8)  
Engineered Safety Feature Actuation System Instrumentation

| FUNCTION                                  | APPLICABLE<br>MODES OR<br>OTHER<br>SPECIFIED<br>CONDITIONS | REQUIRED<br>CHANNELS | CONDITIONS | SURVEILLANCE<br>REQUIREMENTS                          | ALLOWABLE<br>VALUE               | TRIP<br>SETPOINT <sup>(a)</sup> |
|---|--|----------------------|------------|---|----------------------------------|---------------------------------|
| <b>NOMINAL</b>                            |  |                      |            |   |                                  |                                 |
| 4. Steam Line Isolation (continued)       |  |                      |            |   |                                  |                                 |
| c. Containment Pressure - High 2          | 1,2 <sup>(i)</sup> ,<br>3 <sup>(i)</sup>                   | [4]                  | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ [6.61] psig                    | [6.35] psig                     |
| d. Steam Line Pressure                    |  |                      |            |   |                                  |                                 |
| (1) Low                                   | 1,2 <sup>(i)</sup> ,<br>3 <sup>(b)(i)</sup>                | 3 per steam line     | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ [635] <sup>(c)</sup> psig      | [675] <sup>(c)</sup> psig       |
| (2) Negative Rate - High                  | 3 <sup>(g)(i)</sup>  | 3 per steam line     | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ [121.6] <sup>(h)</sup> psi/sec | [110] <sup>(h)</sup> psi/sec    |
| e. High Steam Flow in Two Steam Lines     | 1,2 <sup>(i)</sup> ,<br>3 <sup>(i)</sup>                   | 2 per steam line     | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | (e)                              | (f)                             |
| Coincident with T <sub>ms</sub> - Low Low | 1,2 <sup>(i)</sup> ,<br>3 <sup>(d)(i)</sup>                | 1 per loop           | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ [550.6] <sup>f</sup>           | [553] <sup>f</sup>              |

(continued)

- (a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
- (b) Above the P-11 (Pressurizer Pressure) interlock.
- (c) Time constants used in the lead/lag controller are  $t_r \geq [50]$  seconds and  $t_d \leq [5]$  seconds.
- (d) Above the P-12 (T<sub>ms</sub> - Low Low) interlock.
- (e) Less than or equal to a function defined as  $\Delta P$  corresponding to [44]% full steam flow below [20]% load,  $\Delta P$  increasing linearly from [44]% full steam flow at [20]% load to [114]% full steam flow at [100]% load, and  $\Delta P$  corresponding to [114]% full steam flow above 100% load.
- (f) Less than or equal to a function defined as  $\Delta P$  corresponding to [40]% full steam flow between [0]% and [20]% load and then a  $\Delta P$  increasing linearly from [40]% steam flow at [20]% load to [110]% full steam flow at [100]% load.
- (g) Below the P-11 (Pressurizer Pressure) interlock.
- (h) Time constant utilized in the rate/lag controller is ≤ [50] seconds.
- (i) Except when all MSIVs are closed and [de-activated].

Table 3.3.2-1 (page 5 of 8)  
 Engineered Safety Feature Actuation System Instrumentation

| FUNCTION                                  | APPLICABLE<br>MODES OR<br>OTHER<br>SPECIFIED<br>CONDITIONS                            | REQUIRED<br>CHANNELS | CONDITIONS | SURVEILLANCE<br>REQUIREMENTS                          | ALLOWABLE<br>VALUE                                      | TRIP<br>SETPOINT (a)                                 |
|---|---|----------------------|------------|---|---|--|
| <b>NOMINAL</b>                            |   |                      |            |   |   |  |
| 4. Steam Line Isolation (continued)       |   |                      |            |   |   |  |
| f. High Steam Flow in Two Steam Lines     | 1,2(i),<br>3(i)   | 2 per steam line     | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | (e)   | (f)  |
| Coincident with Steam Line Pressure - Low | 1,2, (i)<br>3(i)  | 1 per steam line     | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ [635] (c) psig  | ⊕ [675] (c) psig                                     |
| g. High Steam Flow                        | 1,2(i),<br>3(i)   | 2 per steam line     | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ [25]% of full steam flow at no load steam pressure    | ⊕ [ ] full steam flow at no load steam pressure      |
| Coincident with Safety Injection          | Refer to Function 1 (Safety Injection) for all initiation functions and requirements. |                      |            |   |   |  |
| and                                       |   |                      |            |   |   |  |
| Coincident with T <sub>ms</sub> - Low Low | 1,2(i),<br>3(d)(i)  | [2] per loop         | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ [550.6] °F  | ⊕ [553] °F   |
| h. High High Steam Flow                   | 1,2(i),<br>3(i)   | 2 per steam line     | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ [130]% of full steam flow at full load steam pressure | ⊕ [ ] of full steam flow at full load steam pressure |
| Coincident with Safety Injection          | Refer to Function 1 (Safety Injection) for all initiation functions and requirements. |                      |            |   |   |  |

(continued)

- (a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.  
 (d) Above the P-12 (T<sub>ms</sub> - Low Low) interlock.  
 (i) Except when all MSIVs are closed and [de-activated].

Table 3.3.2-1 (page 6 of 8)  
 Engineered Safety Feature Actuation System Instrumentation

| FUNCTION  | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS  | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS                             | ALLOWABLE VALUE | TRIP SETPOINT (a) |
|---|---|-------------------|------------|---|-----------------|-------------------|
| <b>NOMINAL</b>  |   |                   |            |   |                 |                   |
| 5. Turbine Trip and Feedwater Isolation   |   |                   |            |   |                 |                   |
| a. Automatic Actuation Logic and Actuation Relays                                 | 1,2(j),<br>(3)(j)   | 2 trains          | HIG        | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6                | NA              | NA                |
| b. SG Water Level - High High (P-14)  | 1,2(j),<br>(3)(j)   | (3) per SG        | 1(D)       | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ (84.2)%       | ② (82.4)%         |
| c. Safety Injection   | Refer to Function 1 (Safety Injection) for all initiation functions and requirements. |                   |            |   |                 |                   |
| 6. Auxiliary Feedwater  |   |                   |            |   |                 |                   |
| a. Automatic Actuation Logic and Actuation Relays (Solid State Protection System) | 1,2,3   | 2 trains          | G          | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6                | NA              | NA                |
| b. Automatic Actuation Logic and Actuation Relays (Balance of Plant ESFAS)        | 1,2,3   | 2 trains          | G          | SR 3.3.2.3  | NA              | NA                |
| c. SG Water Level - Low Low   | 1,2,3   | (3) per SG        | D          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ (30.4)%       | ② (32.2)%         |

(continued)

- (a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.  
 (j) Except when all NFIVs, NFRVs, [and associated bypass valves] are closed and [de-activated] [or isolated by a closed manual valve].

Table 3.3.2-1 (page 7 of 8)  
 Engineered Safety Feature Actuation System Instrumentation

| FUNCTION   | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS  | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS                             | ALLOWABLE VALUE                      | <b>NOMINAL</b><br>TRIP SETPOINT(a)     |
|--|---|-------------------|------------|---|--------------------------------------|--|
| 6. Auxiliary Feedwater (continued)                                     |   |                   |            |   |                                      |  |
| d. Safety Injection  | Refer to Function 1 (Safety Injection) for all initiation functions and requirements. |                   |            |   |                                      |  |
| e. Loss of Offsite Power   | 1,2,3   | (3) per bus       | F          | SR 3.3.2.7<br>SR 3.3.2.9<br>SR 3.3.2.10               | ≥ (2912) V with ≤ 0.8 sec time delay | (2) (2975) V with ≤ 0.8 sec time delay |
| f. Undervoltage Reactor Coolant Pump                                   | 1,2   | (3) per bus       | I          | SR 3.3.2.7<br>SR 3.3.2.9<br>SR 3.3.2.10               | ≥ (69)% bus voltage                  | (2) (70)% bus voltage                  |
| g. Trip of all Main Feedwater Pumps                                    | 1,2   | (2) per pump      | J          | SR 3.3.2.8<br>SR 3.3.2.9<br>SR 3.3.2.10               | ≥ ( ) psig                           | (2) ( ) psig                           |
| h. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure - Low | 1,2,3   | (2)               | F          | SR 3.3.2.1<br>SR 3.3.2.7<br>SR 3.3.2.9                | ≥ (20.53) [psia]                     | (2) ( ) [psia]                         |
| 7. Automatic Switchover to Containment Sump                            |   |                   |            |   |                                      |  |
| a. Automatic Actuation Logic and Actuation Relays                      | 1,2,3,4   | 2 trains          | C          | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6                | NA                                   | NA                                     |
| b. Refueling Water Storage Tank (RWST) Level - Low Low                 | 1,2,3,4   | 4                 | K          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ (15)% and ≤ ( ) %                  | (2) ( ) and ( ) ( )                    |
| Coincident with Safety Injection                                       | Refer to Function 1 (Safety Injection) for all initiation functions and requirements. |                   |            |   |                                      |  |

(continued)

(a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.

Table 3.3.2-1 (page 8 of 8)  
 Engineered Safety Feature Actuation System Instrumentation

| FUNCTION   | APPLICABLE<br>NODES OR<br>OTHER<br>SPECIFIED<br>CONDITIONS                            | REQUIRED<br>CHANNELS  | CONDITIONS | SURVEILLANCE<br>REQUIREMENTS                          | ALLOWABLE<br>VALUE               | <b>NOMINAL</b><br>TRIP<br>SETPOINT (a) |
|--|---|-----------------------|------------|---|----------------------------------|--|
| <b>7. Automatic Switchover to Containment Sump (continued)</b> |   |                       |            |   |                                  |  |
| c. RWST Level - Low Low  | 1,2,3,4   | 4                     | K          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ [15]%                          | ② [18]%                                |
| Coincident with Safety Injection                               | Refer to Function 1 (Safety Injection) for all initiation functions and requirements. |                       |            |   |                                  |  |
| and  |   |                       |            |   |                                  |  |
| Coincident with Containment Sump Level - High                  | 1,2,3,4   | 4                     | K          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ [30] in. above<br>el. [703] ft | ② [ ] in. above<br>el. [ ] ft          |
| <b>8. ESFAS Interlocks</b>                                     |   |                       |            |   |                                  |  |
| a. Reactor Trip, P-4   | 1,2,3   | 1 per train, 2 trains | F          | SR 3.3.2.11   | NA                               | NA                                     |
| b. Pressurizer Pressure, P-11                                  | 1,2,3   | 3                     | L          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9                | ≤ [1996] psig                    | ② [ ] psig                             |
| c. T <sub>avg</sub> - Low Low, P-12                            | 1,2,3   | [1] per loop          | L          | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9                | ≥ [550.6] °F                     | ② [553] °F                             |

(a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.

## B 3.3 INSTRUMENTATION

### B 3.3.1 Reactor Trip System (RTS) Instrumentation

#### BASES

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#### BACKGROUND

The RTS initiates a unit shutdown, based on the values of selected unit parameters, to protect against violating the core fuel design limits and Reactor Coolant System (RCS) pressure boundary during anticipated operational occurrences (AOOs) and to assist the Engineered Safety Features (ESF) Systems in mitigating accidents.

The protection and monitoring systems have been designed to assure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RTS, as well as specifying LCOs on other reactor system parameters and equipment performance.

Insert 3

~~The LSSS, defined in this specification as the [Trip Setpoints], in conjunction with the LCOs, establish the threshold for protective system action to prevent exceeding acceptable limits during Design Basis Accidents (DBAs).~~

During AOOs, which are those events expected to occur one or more times during the unit life, the acceptable limits are:

1. The Departure from Nucleate Boiling Ratio (DNBR) shall be maintained above the Safety Limit (SL) value to prevent departure from nucleate boiling (DNB);
2. Fuel centerline melt shall not occur; and
3. The RCS pressure SL of 2750 psia shall not be exceeded.

Operation within the SLs of Specification 2.0, "Safety Limits (SLs)," also maintains the above values and assures that offsite dose will be within the 10 CFR 50 and 10 CFR 100 criteria during AOOs.

Accidents are events that are analyzed even though they are not expected to occur during the unit life. The acceptable limit during accidents is that offsite dose shall be maintained within an acceptable fraction of 10 CFR 100 limits. Different accident categories are allowed a

(continued)

BASES

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BACKGROUND  
(continued)

different fraction of these limits, based on probability of occurrence. Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

The RTS instrumentation is segmented into four distinct but interconnected modules as illustrated in Figure [ ], FSAR, Chapter [7] (Ref. 1), and as identified below:

1. Field transmitters or process sensors: provide a measurable electronic signal based upon the physical characteristics of the parameter being measured;
2. Signal Process Control and Protection System, including Analog Protection System, Nuclear Instrumentation System (NIS), field contacts, and protection channel sets: provides signal conditioning, bistable setpoint comparison, process algorithm actuation, compatible electrical signal output to protection system devices, and control board/control room/miscellaneous indications;
3. Solid State Protection System (SSPS), including input, logic, and output bays: initiates proper unit shutdown and/or ESF actuation in accordance with the defined logic, which is based on the bistable outputs from the signal process control and protection system; and
4. Reactor trip switchgear, including reactor trip breakers (RTBs) and bypass breakers: provides the means to interrupt power to the control rod drive mechanisms (CRDMs) and allows the rod cluster control assemblies (RCCAs), or "rods," to fall into the core and shut down the reactor. The bypass breakers allow testing of the RTBs at power.

Field Transmitters or Sensors

To meet the design demands for redundancy and reliability, more than one, and often as many as four, field transmitters or sensors are used to measure unit parameters. To account for the calibration tolerances and instrument drift, which are assumed to occur between calibrations, statistical allowances are provided in the Trip Setpoint and Allowable

(continued)



BASES

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BACKGROUND

Field Transmitters or Sensors (continued)

Insert 4

Values. The OPERABILITY of each transmitter or sensor can be evaluated when its "as found" calibration data are compared against its documented acceptance criteria.

Signal Process Control and Protection System

Generally, three or four channels of process control equipment are used for the signal processing of unit parameters measured by the field instruments. The process control equipment provides signal conditioning, comparable output signals for instruments located on the main control board, and comparison of measured input signals with setpoints established by safety analyses. These setpoints are defined in FSAR, Chapter [7] (Ref. 1), Chapter [6] (Ref. 2), and Chapter [15] (Ref. 3). If the measured value of a unit parameter exceeds the predetermined setpoint, an output from a bistable is forwarded to the SSPS for decision evaluation. Channel separation is maintained up to and through the input bays. However, not all unit parameters require four channels of sensor measurement and signal processing. Some unit parameters provide input only to the SSPS, while others provide input to the SSPS, the main control board, the unit computer, and one or more control systems.

Generally, if a parameter is used only for input to the protection circuits, three channels with a two-out-of-three logic are sufficient to provide the required reliability and redundancy. If one channel fails in a direction that would not result in a partial Function trip, the Function is still OPERABLE with a two-out-of-two logic. If one channel fails, such that a partial Function trip occurs, a trip will not occur and the Function is still OPERABLE with a one-out-of-two logic.

Generally, if a parameter is used for input to the SSPS and a control function, four channels with a two-out-of-four logic are sufficient to provide the required reliability and redundancy. The circuit must be able to withstand both an input failure to the control system, which may then require the protection function actuation, and a single failure in the other channels providing the protection function actuation. Again, a single failure will neither cause nor

(continued)

BASES

BACKGROUND

Signal Process Control and Protection System (continued)

prevent the protection function actuation. These requirements are described in IEEE-279-1971 (Ref. 4). The actual number of channels required for each unit parameter is specified in Reference 1.

Two logic channels are required to ensure no single random failure of a logic channel will disable the RTS. The logic channels are designed such that testing required while the reactor is at power may be accomplished without causing trip. Provisions to allow removing logic channels from service during maintenance are unnecessary because of the logic system's designed reliability.

*and RTS Setpoints*

Trip Setpoints and Allowable Values

The Trip Setpoints are the nominal values at which the bistables are set. Any bistable is considered to be properly adjusted when the "as left" value is within the band for CHANNEL CALIBRATION accuracy (i.e.,  $\pm$  rack calibration + comparator setting accuracy).

The Trip Setpoints used in the bistables are based on the analytical limits stated in Reference 1. The selection of these Trip Setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those RTS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 5), the Trip Setpoints and Allowable Values specified in Table 3.3.1-1 in the accompanying LCO are conservative adjusted with respect to the analytical limits. A detailed description of the methodology used to calculate the Trip Setpoints, including their explicit uncertainties, is provided in the "RTS/ESFAS Setpoint Methodology Study" (Ref. 6).

*Allowed Value and*

The actual nominal Trip Setpoint entered into the bistable is more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a COT. One example of such a change in measurement error is drift during the surveillance interval. If the measured setpoint does not exceed the Allowable Value, the bistable is considered OPERABLE.

*Insert 5*

(continued)

requirements of the

and RTS Setpoints

BASES

BACKGROUND

Trip Setpoints and Allowable Values (continued)

Consistent Trip

Setpoints in accordance with the Allowable Value ensure that SLs are not violated during AOOs (and that the consequences of DBAs will be acceptable, providing the unit is operated from within the LCOs at the onset of the AOO or DBA and the equipment functions as designed). Note that in the accompanying LCO 3.3.1, the Trip Setpoints of Table 3.3.1-1 are the LSSS.

Each channel of the process control equipment can be tested on line to verify that the signal or setpoint accuracy is within the specified allowance requirements of Reference 2. Once a designated channel is taken out of service for testing, a simulated signal is injected in place of the field instrument signal. The process equipment for the channel in test is then tested, verified, and calibrated. SRs for the channels are specified in the SRs section.

The Trip Setpoints and Allowable Values listed in Table 3.3.1-1 are based on the methodology described in Reference 6, which incorporates all of the known uncertainties applicable for each channel. The magnitudes of these uncertainties are factored into the determination of each Trip Setpoint. All field sensors and signal processing equipment for these channels are assumed to operate within the allowances of these uncertainty magnitudes.

Solid State Protection System

The SSPS equipment is used for the decision logic processing of outputs from the signal processing equipment bistables. To meet the redundancy requirements, two trains of SSPS, each performing the same functions, are provided. If one train is taken out of service for maintenance or test purposes, the second train will provide reactor trip and/or ESF actuation for the unit. If both trains are taken out of service or placed in test, a reactor trip will result. Each train is packaged in its own cabinet for physical and electrical separation to satisfy separation and independence requirements. The system has been designed to trip in the event of a loss of power, directing the unit to a safe shutdown condition.

(continued)

BASES

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BACKGROUND

Reactor Trip Switchgear (continued)

the reactor trip or ESF, these diagrams also describe the various "permissive interlocks" that are associated with unit conditions. Each train has a built in testing device that can automatically test the decision logic matrix Functions and the actuation devices while the unit is at power. When any one train is taken out of service for testing, the other train is capable of providing unit monitoring and protection until the testing has been completed. The testing device is semiautomatic to minimize testing time.

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APPLICABLE  
SAFETY ANALYSES,  
LCO, and  
APPLICABILITY

The RTS functions to maintain the SLs during all AOOs and mitigates the consequences of DBAs in all MODES in which the RTBs are closed.

Each of the analyzed accidents and transients can be detected by one or more RTS Functions. The accident analysis described in Reference 3 takes credit for most RTS trip Functions. RTS trip Functions not specifically credited in the accident analysis are qualitatively credited in the safety analysis and the NRC staff approved licensing basis for the unit. These RTS trip Functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate Function performance. They may also serve as backups to RTS trip Functions that were credited in the accident analysis.

Insert 1

The LCO requires all instrumentation performing an RTS Function, listed in Table 3.3.1-1 in the accompanying LCO, to be OPERABLE. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the affected Functions.

The LCO generally requires OPERABILITY of four or three channels in each instrumentation Function, two channels of Manual Reactor Trip in each logic Function, and two trains in each Automatic Trip Logic Function. Four OPERABLE instrumentation channels in a two-out-of-four configuration are required when one RTS channel is also used as a control system input. This configuration accounts for the possibility of the shared channel failing in such a manner that it creates a transient that requires RTS action. In

(continued)

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## B 3.3 INSTRUMENTATION

### B 3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

#### BASES

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#### BACKGROUND

The ESFAS initiates necessary safety systems, based on the values of selected unit parameters, to protect against violating core design limits and the Reactor Coolant System (RCS) pressure boundary, and to mitigate accidents.

The ESFAS instrumentation is segmented into three distinct but interconnected modules as identified below:

- Field transmitters or process sensors and instrumentation: provide a measurable electronic signal based on the physical characteristics of the parameter being measured;
- Signal processing equipment including analog protection system, field contacts, and protection channel sets: provide signal conditioning, bistable setpoint comparison, process algorithm actuation, compatible electrical signal output to protection system devices, and control board/control room/miscellaneous indications; and
- Solid State Protection System (SSPS) including input, logic, and output bays: initiates the proper unit shutdown or engineered safety feature (ESF) actuation in accordance with the defined logic and based on the bistable outputs from the signal process control and protection system.

Insert 6

#### Field Transmitters or Sensors

To meet the design demands for redundancy and reliability, more than one, and often as many as four, field transmitters or sensors are used to measure unit parameters. In many cases, field transmitters or sensors that input to the ESFAS are shared with the Reactor Trip System (RTS). In some cases, the same channels also provide control system inputs. To account for calibration tolerances and instrument drift, which are assumed to occur between calibrations, statistical allowances are provided in the Trip Setpoint and Allowable

(continued)

BASES

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BACKGROUND

Field Transmitters or Sensors (continued)

Insert 7

Values. The OPERABILITY of each transmitter or sensor can be evaluated when its "as found" calibration data are compared against its documented acceptance criteria.

Signal Processing Equipment

Generally, three or four channels of process control equipment are used for the signal processing of unit parameters measured by the field instruments. The process control equipment provides signal conditioning, comparable output signals for instruments located on the main control board, and comparison of measured input signals with setpoints established by safety analyses. These setpoints are defined in FSAR, Chapter [6] (Ref. 1), Chapter [7] (Ref. 2), and Chapter [15] (Ref. 3). If the measured value of a unit parameter exceeds the predetermined setpoint, an output from a bistable is forwarded to the SSPS for decision evaluation. Channel separation is maintained up to and through the input bays. However, not all unit parameters require four channels of sensor measurement and signal processing. Some unit parameters provide input only to the SSPS, while others provide input to the SSPS, the main control board, the unit computer, and one or more control systems.

Generally, if a parameter is used only for input to the protection circuits, three channels with a two-out-of-three logic are sufficient to provide the required reliability and redundancy. If one channel fails in a direction that would not result in a partial Function trip, the Function is still OPERABLE with a two-out-of-two logic. If one channel fails such that a partial Function trip occurs, a trip will not occur and the Function is still OPERABLE with a one-out-of-two logic.

Generally, if a parameter is used for input to the SSPS and a control function, four channels with a two-out-of-four logic are sufficient to provide the required reliability and redundancy. The circuit must be able to withstand both an input failure to the control system, which may then require the protection function actuation, and a single failure in the other channels providing the protection function

(continued)

BASES

BACKGROUND

Signal Processing Equipment (continued)

actuation. Again, a single failure will neither cause nor prevent the protection function actuation.

These requirements are described in IEEE-279-1971 (Ref. 4). The actual number of channels required for each unit parameter is specified in Reference 2.

Trip Setpoints and Allowable Values *and ESFAS setpoints*

The Trip Setpoints are the nominal values at which the bistables are set. Any bistable is considered to be properly adjusted when the "as left" value is within the band for CHANNEL CALIBRATION accuracy.

The Trip Setpoints used in the bistables are based on the analytical limits stated in Reference 2. The selection of these Trip Setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those ESFAS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 5), the Trip Setpoints and Allowable Values specified in Table 3.3.2-1 in the accompanying LCO are conservatively adjusted with respect to the analytical limits. A detailed description of the methodology used to calculate the Trip Setpoints, including their explicit uncertainties, is provided in the "RTS/ESFAS Setpoint Methodology Study" (Ref. 6). The actual nominal Trip Setpoint entered into the bistable is more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a COT. One example of such a change in measurement error is drift during the surveillance interval. If the measured setpoint does not exceed the Allowable Value, the bistable is considered OPERABLE.

*Insert 8*

*adjusted consistent with the requirements of the*

Setpoints in accordance with the Allowable Value ensure that the consequences of Design Basis Accidents (DBAs) will be acceptable, providing the unit is operated from within the LCOs at the onset of the DBA and the equipment functions as designed.

(continued)

BASES

and ESFAS Setpoints

BACKGROUND

Trip Setpoints and Allowable Values (continued)

Each channel can be tested on line to verify that the signal processing equipment and setpoint accuracy is within the specified allowance requirements of Reference 2. Once a designated channel is taken out of service for testing, a simulated signal is injected in place of the field instrument signal. The process equipment for the channel in test is then tested, verified, and calibrated. SRs for the channels are specified in the SR section.

~~The Trip Setpoints and Allowable Values listed in Table 3.3.2-1 are based on the methodology described in Reference 6, which incorporates all of the known uncertainties applicable for each channel. The magnitudes of these uncertainties are factored into the determination of each Trip Setpoint. All field sensors and signal processing equipment for these channels are assumed to operate within the allowances of these uncertainty magnitudes.~~

#### Solid State Protection System

The SSPS equipment is used for the decision logic processing of outputs from the signal processing equipment bistables. To meet the redundancy requirements, two trains of SSPS, each performing the same functions, are provided. If one train is taken out of service for maintenance or test purposes, the second train will provide ESF actuation for the unit. If both trains are taken out of service or placed in test, a reactor trip will result. Each train is packaged in its own cabinet for physical and electrical separation to satisfy separation and independence requirements.

The SSPS performs the decision logic for most ESF equipment actuation; generates the electrical output signals that initiate the required actuation; and provides the status, permissive, and annunciator output signals to the main control room of the unit.

The bistable outputs from the signal processing equipment are sensed by the SSPS equipment and combined into logic matrices that represent combinations indicative of various

(continued)



BASES (continued)

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APPLICABLE  
SAFETY ANALYSES,  
LCO, AND  
APPLICABILITY

Each of the analyzed accidents can be detected by one or more ESFAS Functions. One of the ESFAS Functions is the primary actuation signal for that accident. An ESFAS Function may be the primary actuation signal for more than one type of accident. An ESFAS Function may also be a secondary, or backup, actuation signal for one or more other accidents. For example, Pressurizer Pressure—Low is a primary actuation signal for small loss of coolant accidents (LOCAs) and a backup actuation signal for steam line breaks (SLBs) outside containment. Functions such as manual initiation, not specifically credited in the accident safety analysis, are qualitatively credited in the safety analysis and the NRC staff approved licensing basis for the unit. These Functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate Function performance. These Functions may also serve as backups to Functions that were credited in the accident analysis (Ref. 3).

Insert 2

The LCO requires all instrumentation performing an ESFAS Function to be OPERABLE. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the affected Functions.

The LCO generally requires OPERABILITY of four or three channels in each instrumentation function and two channels in each logic and manual initiation function. The two-out-of-three and the two-out-of-four configurations allow one channel to be tripped during maintenance or testing without causing an ESFAS initiation. Two logic or manual initiation channels are required to ensure no single random failure disables the ESFAS.

The required channels of ESFAS instrumentation provide unit protection in the event of any of the analyzed accidents. ESFAS protection functions are as follows:

1. Safety Injection

Safety Injection (SI) provides two primary functions:

1. Primary side water addition to ensure maintenance or recovery of reactor vessel water level (coverage of the active fuel for heat removal, clad integrity, and for limiting peak clad temperature to < 2200°F); and

(continued)

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BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.3.2.11 (continued)

Trip Interlock, and the Frequency is once per RTB cycle. This Frequency is based on operating experience demonstrating that undetected failure of the P-4 interlock sometimes occurs when the RTB is cycled.

The SR is modified by a Note that excludes verification of setpoints during the TADOT. The Function tested has no associated setpoint.

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REFERENCES

1. FSAR, Chapter [6].
2. FSAR, Chapter [7].
3. FSAR, Chapter [15].
4. IEEE-279-1971.
5. 10 CFR 50.49. *Plant-specific*
6. ~~RTS/ESFAS~~ Setpoint Methodology Study.
7. NUREG-1218, April 1988.
8. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.
9. Technical Requirements Manual, Section 15, "Response Times."

10. Regulatory Guide 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation."

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### B 3.3 INSTRUMENTATION

#### B 3.3.1 Reactor Protection System (RPS) Instrumentation

##### BASES

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##### BACKGROUND

The RPS initiates a reactor trip to protect against violating the core fuel design limits and the Reactor Coolant System (RCS) pressure boundary during anticipated operational occurrences (AOOs). By tripping the reactor, the RPS also assists the Engineered Safety Feature (ESF) Systems in mitigating accidents.

The protection and monitoring systems have been designed to assure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RPS, as well as the LCOs on other reactor system parameters and equipment performance.

Insert 9

The LSSS, defined in this Specification as the Allowable Value, in conjunction with the LCOs, establishes the threshold for protective system action to prevent exceeding acceptable limits during Design Basis Accidents (DBAs).

During AOOs, which are those events expected to occur one or more times during the unit's life, the acceptable limit is:

- a. The departure from nucleate boiling ratio (DNBR) shall be maintained above the Safety Limit (SL) value;
- b. Fuel centerline melt shall not occur; and
- c. The RCS pressure SL of 2750 psia shall not be exceeded.

Maintaining the parameters within the above values ensures that the offsite dose will be within the 10 CFR 20 and 10 CFR 100 criteria during AOOs.

Accidents are events that are analyzed even though they are not expected to occur during the unit's life. The acceptable limit during accidents is that the offsite dose shall be maintained within 10 CFR 100 limits. Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

(continued)

B 3.3 INSTRUMENTATION

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B 3.3.1 Reactor Protective System (RPS) Instrumentation—Operating (Analog)

BASES

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BACKGROUND

The RPS initiates a reactor trip to protect against violating the core specified acceptable fuel design limits and breaching the reactor coolant pressure boundary during anticipated operational occurrences (AOOs). By tripping the reactor, the RPS also assists the Engineered Safety Features systems in mitigating accidents.

The protection and monitoring systems have been designed to ensure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RPS, as well as LCOs on other reactor system parameters and equipment performance.

Insert 9 →

The LSSS, defined in this Specification as the Allowable Value, in conjunction with the LCOs, establish the threshold for protective system action to prevent exceeding acceptable limits during Design Basis Accidents (DBAs).

During AOOs, which are those events expected to occur one or more times during the plant life, the acceptable limits are:

- The departure from nucleate boiling ratio (DNBR) shall be maintained above the Safety Limit (SL) value to prevent departure from nucleate boiling;
- Fuel centerline melting shall not occur; and
- The Reactor Coolant System (RCS) pressure SL of 2750 psia shall not be exceeded.

Maintaining the parameters within the above values ensures that the offsite dose will be within the 10 CFR 50 (Ref. 1) and 10 CFR 100 (Ref. 2) criteria during AOOs.

Accidents are events that are analyzed even though they are not expected to occur during the plant life. The acceptable limit during accidents is that the offsite dose shall be maintained within an acceptable fraction of 10 CFR 100 (Ref. 2) limits. Different accident categories allow a different fraction of these limits based on probability of

(continued)

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B 3.3 INSTRUMENTATION

B 3.3.1 Reactor Protective System (RPS) Instrumentation—Operating (Digital)

BASES

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BACKGROUND

The RPS initiates a reactor trip to protect against violating the core specified acceptable fuel design limits and breaching the reactor coolant pressure boundary (RCPB) during anticipated operational occurrences (AOOs). By tripping the reactor, the RPS also assists the Engineered Safety Features (ESF) systems in mitigating accidents.

The protection and monitoring systems have been designed to ensure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RPS, as well as LCOs on other reactor system parameters and equipment performance.

Insert 9

~~The LSSS, defined in this Specification as the Allowable Value, in conjunction with the LCOs, establish the threshold for protective system action to prevent exceeding acceptable limits during Design Basis Accidents (DBAs).~~

During AOOs, which are those events expected to occur one or more times during the plant life, the acceptable limits are:

- The departure from nucleate boiling ratio (DNBR) shall be maintained above the Safety Limit (SL) value to prevent departure from nucleate boiling (DNB);
- Fuel centerline melting shall not occur; and
- The Reactor Coolant System (RCS) pressure SL of 2750 psia shall not be exceeded.

Maintaining the parameters within the above values ensures that the offsite dose will be within the 10 CFR 50 (Ref. 1) and 10 CFR 100 (Ref. 2) criteria during AOOs.

Accidents are events that are analyzed even though they are not expected to occur during the plant life. The acceptable limit during accidents is that the offsite dose shall be maintained within an acceptable fraction of 10 CFR 100 (Ref. 2) limits. Different accident categories allow a different fraction of these limits based on probability of

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B 3.3 INSTRUMENTATION

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B 3.3.1.1 Reactor Protection System (RPS) Instrumentation

BASES

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BACKGROUND

The RPS initiates a reactor scram when one or more monitored parameters exceed their specified limits, to preserve the integrity of the fuel cladding and the Reactor Coolant System (RCS) and minimize the energy that must be absorbed following a loss of coolant accident (LOCA). This can be accomplished either automatically or manually.

The protection and monitoring functions of the RPS have been designed to ensure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RPS, as well as LCOs on other reactor system parameters and equipment performance. The LSSS are defined in this

*Insert 9* Specification as the Allowable Values, which, in conjunction with the LCOs, establish the threshold for protective system action to prevent exceeding acceptable limits, including Safety Limits (SLs) during Design Basis Accidents (DBAs).

The RPS, as shown in the FSAR, Figure [ ] (Ref. 1), includes sensors, relays, bypass circuits, and switches that are necessary to cause initiation of a reactor scram. Functional diversity is provided by monitoring a wide range of dependent and independent parameters. The input parameters to the scram logic are from instrumentation that monitors reactor vessel water level, reactor vessel pressure, neutron flux, main steam line isolation valve position, turbine control valve (TCV) fast closure, trip oil pressure, turbine stop valve (TSV) position, drywell pressure, and scram discharge volume (SDV) water level, as well as reactor mode switch in shutdown position and manual scram signals. There are at least four redundant sensor input signals from each of these parameters (with the exception of the reactor mode switch in shutdown scram signal). Most channels include electronic equipment (e.g., trip units) that compares measured input signals with pre-established setpoints. When the setpoint is exceeded, the channel output relay actuates, which then outputs an RPS trip signal to the trip logic. Table B 3.3.1.1-1 summarizes the diversity of sensors capable of initiating scrams during anticipated operating transients typically analyzed.

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### B 3.3 INSTRUMENTATION

#### B 3.3.1.1 Reactor Protection System (RPS) Instrumentation

##### BASES

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##### BACKGROUND

The RPS initiates a reactor scram when one or more monitored parameters exceed their specified limit, to preserve the integrity of the fuel cladding and the Reactor Coolant System (RCS), and minimize the energy that must be absorbed following a loss of coolant accident (LOCA). This can be accomplished either automatically or manually.

The protection and monitoring functions of the RPS have been designed to ensure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RPS, as well as LCOs on other reactor system parameters, and equipment performance.

The LSSS are defined in this Specification as the Allowable Values, which, in conjunction with the LCOs, establish the threshold for protective system action to prevent exceeding acceptable limits, including Safety Limits (SLs), during Design Basis Accidents (DBAs).

Insert 9

The RPS, as shown in the FSAR, Figure [ ] (Ref. 1), includes sensors, relays, bypass circuits, and switches that are necessary to cause initiation of a reactor scram. Functional diversity is provided by monitoring a wide range of dependent and independent parameters. The input parameters to the scram logic are from instrumentation that monitors reactor vessel water level; reactor vessel pressure; neutron flux main steam line isolation valve position; turbine control valve (TCV) fast closure, trip oil pressure low; turbine stop valve (TSV) trip oil pressure, low; drywell pressure and scram discharge volume (SDV) water level; as well as reactor mode switch in shutdown position and manual scram signals. There are at least four redundant sensor input signals from each of these parameters (with the exception of the reactor mode switch in shutdown scram signal). Most channels include electronic equipment (e.g., trip units) that compares measured input signals with pre-established setpoints. When a setpoint is exceeded, the channel output relay actuates, which then outputs an RPS trip signal to the trip logic. Table B 3.3.1.1-1 summarizes the diversity of sensors capable of initiating scrams during anticipated operating transients typically analyzed.

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