

## REACTIVITY CONTROL SYSTEMS

### 3/4.1.2 BORATION SYSTEMS

#### FLOW PATHS - SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

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3.1.2.1 As a minimum, one of the following boron injection flow paths shall be OPERABLE and capable of being powered from an OPERABLE emergency power source:

- a. A flow path from the boric acid makeup tank via either a boric acid makeup pump or a gravity feed connection and any charging pump to the Reactor Coolant System if the boric acid makeup tank in Specification 3.1.2.7a. is OPERABLE, or
- b. The flow path from the refueling water storage pool via either a charging pump or a high pressure safety injection pump to the Reactor Coolant System if the refueling water storage pool in Specification 3.1.2.7b. is OPERABLE.

APPLICABILITY: MODES 5 and 6.

#### ACTION:

With none of the above flow paths OPERABLE or capable of being powered from an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.\*

#### SURVEILLANCE REQUIREMENTS

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4.1.2.1 At least one of the above required flow paths shall be demonstrated OPERABLE:

- a. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F by verifying the Boric Acid Makeup Tank solution is greater than 55°F (when the flow path from the boric acid makeup tank is used).
- b. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

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\* Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

## REACTIVITY CONTROL SYSTEMS

### CHARGING PUMPS - SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

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3.1.2.3 At least one charging pump or one high pressure safety injection pump in the boron injection flow path required OPERABLE pursuant to Specification 3.1.2.1 shall be OPERABLE and capable of being powered from an OPERABLE emergency power source.

APPLICABILITY: MODES 5 and 6.

#### ACTION:

With no charging pump or high pressure safety injection pump OPERABLE or capable of being powered from an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes. \*

#### SURVEILLANCE REQUIREMENTS

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4.1.2.3 No additional Surveillance Requirements other than those required by Specification 4.0.5.

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\* Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

## REACTIVITY CONTROL SYSTEMS

### BORIC ACID MAKEUP PUMPS - SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

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3.1.2.5 At least one boric acid makeup pump shall be OPERABLE and capable of being powered from an OPERABLE emergency bus if only the flow path through the boric acid pump in Specification 3.1.2.1a. is OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no boric acid makeup pump OPERABLE as required to complete the flow path of Specification 3.1.2.1a., suspend all operations involving CORE ALTERATIONS or positive reactivity changes. \*

#### SURVEILLANCE REQUIREMENTS

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4.1.2.5 No additional Surveillance Requirements other than those required by Specification 4.0.5.

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\* Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

## REACTIVITY CONTROL SYSTEMS

### BORATED WATER SOURCES - SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

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3.1.2.7 As a minimum, one of the following borated water sources shall be OPERABLE:

- a. One boric acid makeup tank with a boron concentration between 2.25 and 3.50 weight percent and a minimum borated water volume of 36% indicated level.
- b. The refueling water storage pool (RWSP) with:
  1. A minimum contained borated water volume of 12% indicated level, and
  2. A minimum boron concentration of 2050 ppm.

APPLICABILITY: MODES 5 and 6.

#### ACTION:

With no borated water sources OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes. \*

#### SURVEILLANCE REQUIREMENTS

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4.1.2.7 The above required borated water source shall be demonstrated OPERABLE:

- a. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F by verifying the boric acid makeup tank solution is greater than 55°F (when it is the source of borated water).
- b. At least once per 7 days by:
  1. Verifying the boron concentration of the water, and
  2. Verifying the contained borated water volume of the tank.

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\* Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

TABLE 3.3-1 (Continued)

ACTION STATEMENTS

2.	Pressurizer Pressure - High	Pressurizer Pressure - High Local Power Density - High DNBR - Low
3.	Containment Pressure - (RPS) High	Containment Pressure - High Containment Pressure - High (ESF)
4.	Steam Generator Pressure - Low	Steam Generator Pressure - Low Steam Generator $\Delta P$ 1 and 2 (EFAS 1 and 2)
5.	Steam Generator Level	Steam Generator Level - Low Steam Generator Level - High Steam Generator $\Delta P$ (EFAS)
6.	Core Protection Calculator	Local Power Density - High DNBR - Low

STARTUP and/or POWER OPERATION may continue until the performance of the next required CHANNEL FUNCTIONAL TEST. Subsequent STARTUP and/or POWER OPERATION may continue if one channel is restored to OPERABLE status and the provisions of ACTION 2 are satisfied.

ACTION 4 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, suspend all operations involving positive reactivity changes. \*

ACTION 5 - With the number of channels OPERABLE one less those required by the Minimum Channels OPERABLE requirement, STARTUP and/or POWER OPERATION may continue provided the reactor trip breakers of the inoperable channel are placed in the tripped condition within 1 hour; otherwise, be in at least HOT STANDBY within 6 hours; however, one channel may be bypassed for up to 1 hour for surveillance testing per Specification 4.3.1.1.

ACTION 6 - a. With one CEAC inoperable, operation may continue for up to 7 days provided that at least once per 4 hours, each CEA is verified to be within 7 inches (indicated position) of all other CEAs in its group.

\* Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SHUTDOWN MARGIN.

TABLE 3.3-1 (Continued)

ACTION STATEMENTS

- b. With both CEACs inoperable, operation may continue provided that:
1. Within 1 hour the DNBR margin required by Specification 3.2.4b (COLSS in service) or 3.2.4d (COLSS out of service) is satisfied and the Reactor Power Cutback System is disabled, and
  2. Within 4 hours:
    - a) All CEA groups are withdrawn to and subsequently maintained at the "Full Out" position, except during surveillance testing pursuant to the requirements of Specification 4.1.3.1.2 or for control when CEA group 6 may be inserted no further than 127.5 inches withdrawn.
    - b) The "RSPT/CEAC Inoperable" addressable constant in the CPCs is set to the inoperable status.
    - c) The Control Element Drive Mechanism Control System (CEDMCS) is placed in and subsequently maintained in the "Off" mode except during CEA group 6 motion permitted by a) above, when the CEDMCS may be operated in either the "Manual Group" or "Manual Individual" mode.
  3. At least once per 4 hours, all CEAs are verified fully withdrawn except during surveillance testing pursuant to Specification 4.1.3.1.2 or during insertion of CEA group 6 as permitted by 2.a) above, then verify at least once per 4 hours that the inserted CEAs are aligned within 7 inches (indicated position) of all other CEAs in its group.

**ACTION 7** - With three or more auto restarts of one non-bypassed calculator during a 12-hour interval, demonstrate calculator OPERABILITY by performing a CHANNEL FUNCTIONAL TEST within the next 24 hours.

**ACTION 8** - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement restore the inoperable channel to OPERABLE status within 48 hours or open the reactor trip breakers within the next hour.

## REACTOR COOLANT SYSTEM

### HOT STANDBY

#### LIMITING CONDITION FOR OPERATION

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3.4.1.2 The reactor coolant loops listed below shall be OPERABLE and at least one of these reactor coolant Loops shall be in operation.\*

- a. Reactor Coolant Loop 1 and its associated steam generator and at least one associated reactor coolant pump.
- b. Reactor Coolant Loop 2 and its associated steam generator and at least one associated reactor coolant pump.

APPLICABILITY: MODE 3\*\*.

#### ACTION:

- a. With less than the above required reactor coolant loops OPERABLE, restore the required loops to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.
- b. With no reactor coolant loop in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specification 3.1.1.1 or 3.1.1.2 and immediately initiate corrective action to return the required reactor coolant loop to operation.

#### SURVEILLANCE REQUIREMENTS

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4.4.1.2.1 At least the above required reactor coolant pumps, if not in operation, shall be determined to be OPERABLE once per 7 days by verifying correct breaker alignments and indicated power availability.

4.4.1.2.2 At least one reactor coolant loop shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

4.4.1.2.3 The required steam generator(s) shall be determined OPERABLE by verifying the secondary side water level to be  $\geq 50\%$  of wide range indication at least once per 12 hours.

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\*All reactor coolant pumps may be deenergized for up to 1 hour provided (1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of Technical Specification 3.1.1.1 or 3.1.1.2, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

\*\*See Special Test Exception 3.10.5.

## REACTOR COOLANT SYSTEM

### HOT SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

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3.4.1.3 At least two of the loop(s)/train(s) listed below shall be OPERABLE and at least one reactor coolant and/or shutdown cooling loops shall be in operation.\*

- a. Reactor Coolant Loop 1 and its associated steam generator and at least one associated reactor coolant pump,\*\*
- b. Reactor Coolant Loop 2 and its associated steam generator and at least one associated reactor coolant pump,\*\*
- c. Shutdown Cooling Train A,
- d. Shutdown Cooling Train B.

APPLICABILITY: MODE 4

#### ACTION:

- a. With less than the above required reactor coolant and/or shutdown cooling loops OPERABLE, immediately initiate corrective action to return the required loops to OPERABLE status as soon as possible; if the remaining OPERABLE loop is a shutdown cooling loop, be in COLD SHUTDOWN within 24 hours.
- b. With no reactor coolant or shutdown cooling loop in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meeting SHUTDOWN MARGIN of Technical Specification 3.1.1.1 or 3.1.1.2 and immediately initiate corrective action to return the required coolant loop to operation.

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\* All reactor coolant pumps and shutdown cooling pumps (LPSI pumps) may be deenergized for up to 1 hour provided (1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of Technical Specification 3.1.1.1 or 3.1.1.2, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

\*\*A reactor coolant pump shall not be started with one or more of the Reactor Coolant System cold leg temperatures less than or equal to 272°F unless (1) the pressurizer water volume is less than 900 cubic feet or (2) the secondary water temperature of each steam generator is less than 100°F above each of the Reactor Coolant System cold leg temperatures.



## REACTOR COOLANT SYSTEM

### COLD SHUTDOWN - LOOPS FILLED

#### LIMITING CONDITION FOR OPERATION

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3.4.1.4 At least two of the loop(s)/trains listed below shall be OPERABLE and at least one reactor coolant and/or shutdown cooling loop shall be in operation.\*

- a. Reactor Coolant Loop 1 and its associated steam generator and at least one associated reactor coolant pump\*\*,
- b. Reactor Coolant Loop 2 and its associated steam generator and at least one associated reactor coolant pump\*\*,
- c. Shutdown Cooling Train A,
- d. Shutdown Cooling Train B.

APPLICABILITY: MODE 5 with reactor coolant loops filled\*\*.

#### ACTION:

- a. With less than the above required reactor coolant and/or shutdown cooling loops OPERABLE or with less than the required steam generator level, immediately initiate corrective action to return the required loops to OPERABLE status or to restore the required level as soon as possible.
- b. With no reactor coolant or shutdown cooling loop in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specification 3.1.1.1 or 3.1.1.2 and immediately initiate corrective action to return the required coolant loop to operation.

#### SURVEILLANCE REQUIREMENTS

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4.4.1.4.1 The required reactor coolant pump(s), if not in operation, shall be determined to be OPERABLE once per 7 days by verifying correct breaker alignments and indicated power availability.

4.4.1.4.2 The required steam generator(s) shall be determined OPERABLE by verifying the secondary side water level to be  $\geq 50\%$  of wide range indication at least once per 12 hours.

4.4.1.4.3 At least one reactor coolant loop or shutdown cooling train shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

\*All reactor coolant pumps and shutdown cooling pumps (LPSI pumps) may be deenergized for up to 1 hour provided (1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of Technical Specification 3.1.1.1 or 3.1.1.2, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

\*\*A reactor coolant pump shall not be started with one or more of the Reactor Coolant System cold leg temperatures less than or equal to 272°F unless (1) the pressurizer water volume is less than 900 cubic feet or (2) the secondary water temperature of each steam generator is less than 100°F above each of the Reactor Coolant System cold leg temperatures.

## REACTOR COOLANT SYSTEM

### COLD SHUTDOWN - LOOPS NOT FILLED

#### LIMITING CONDITION FOR OPERATION

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3.4.1.5 Two shutdown cooling loops shall be OPERABLE# and at least one shutdown cooling loop shall be in operation.\*

APPLICABILITY: MODE 5 with reactor coolant loops not filled.

ACTION:

- a. With less than the above required loops OPERABLE, immediately initiate corrective action to return the required loops to OPERABLE status as soon as possible.
- b. With no shutdown cooling loop in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specification 3.1.1.1 or 3.1.1.2 and immediately initiate corrective action to return the required shutdown cooling loop to operation.

#### SURVEILLANCE REQUIREMENTS

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4.4.1.5 At least one shutdown cooling loop shall be determined to be in operation and circulating reactor coolant at least once per 12 hours.

# One shutdown cooling loop may be inoperable for up to 2 hours for surveillance testing provided the other shutdown cooling loop is OPERABLE and in operation.

\* The shutdown cooling pump (LPSI pump) may be deenergized for up to 1 hour provided (1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of Technical Specification 3.1.1.1 or 3.1.1.2, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

## ELECTRICAL POWER SYSTEMS

### A.C. SOURCES

#### SHUTDOWN

### LIMITING CONDITION FOR OPERATION

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3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. One circuit between the offsite transmission network and the onsite Class 1E distribution system, and
- b. One diesel generator with:
  1. A diesel oil feed tank containing a minimum volume of 339 gallons of fuel,
  2. The diesel fuel oil storage tanks containing:
    - a. A minimum volume of 38,760 gallons of fuel, or
    - b. A fuel oil volume less than 38,760 gallons and greater than 38,000 gallons of fuel for a period not to exceed 5 days (provided replacement fuel oil is onsite within the first 48 hours), and
  3. A fuel transfer pump.

APPLICABILITY: MODES 5 and 6.

#### ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS, operations involving positive reactivity additions that could result in loss of required SHUTDOWN MARGIN or boron concentration, movement of irradiated fuel, or crane operation with loads over the fuel storage pool. In addition, when in MODE 5 with the reactor coolant loops not filled, or in MODE 6 with the water level less than 23 feet above the top of the fuel seated in the reactor pressure vessel, immediately initiate corrective action to restore the required sources to OPERABLE status.

### SURVEILLANCE REQUIREMENTS

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4.8.1.2 The above required A.C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the Surveillance Requirements of 4.8.1.1.1 and 4.8.1.1.2 (except for Surveillance Requirement 4.8.1.1.2a.5.)

## ELECTRICAL POWER SYSTEMS

### D.C. SOURCES

#### SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

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3.8.2.2 As a minimum, one 125-volt battery bank (3A-S or 3B-S) and one associated full capacity charger shall be OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

- a. With the required battery bank inoperable, immediately suspend all operations involving CORE ALTERATIONS, operations involving positive reactivity additions that could result in loss of required SHUTDOWN MARGIN or boron concentration or movement of irradiated fuel; initiate corrective action to restore the required battery bank to OPERABLE status as soon as possible.
- b. With the required full capacity charger inoperable, demonstrate the OPERABILITY of its associated battery bank by performing Surveillance Requirement 4.8.2.1a.1. within 1 hour, and at least once per 8 hours thereafter. If any Category A limit in Table 4.8-2 is not met, declare the battery inoperable.

#### SURVEILLANCE REQUIREMENTS

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4.8.2.2 The above required 125-volt battery bank and charger shall be demonstrated OPERABLE per Surveillance Requirement 4.8.2.1.

## ELECTRICAL POWER SYSTEMS

### ONSITE POWER DISTRIBUTION

#### SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

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3.8.3.2 As a minimum, the following electrical busses shall be energized in the specified manner:

- a. One division of A.C. ESF busses consisting of one 4160 volt and one 480-volt A.C. ESF bus (3A3-S and 3A31-S or 3B3-S and 3B31-S).
- b. Two 120-volt A.C. SUPS busses energized from their associated inverters connected to their respective D.C. busses (3MA-S, 3MB-S, 3MC-S, or 3MD-S).
- c. One 120-volt A.C. SUPS Bus (3A-S or 3B-S) energized from its associated inverter connected to its respective D.C. bus.
- d. One 125-volt D.C. bus (3A-DC-S or 3B-DC-S) connected to its associated battery bank.

APPLICABILITY: MODES 5 and 6.

#### ACTION:

With any of the above required electrical busses not energized in the required manner, immediately suspend all operations involving CORE ALTERATIONS, operations involving positive reactivity additions that could result in loss of required SHUTDOWN MARGIN or boron concentration, or movement of irradiated fuel, initiate corrective action to energize the required electrical busses in the specified manner as soon as possible.

#### SURVEILLANCE REQUIREMENTS

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4.8.3.2 The specified busses shall be determined energized in the required manner at least once per 7 days by verifying correct breaker alignment and indicated voltage on the busses.

## REFUELING OPERATIONS

### 3/4.9.2 INSTRUMENTATION

#### LIMITING CONDITION FOR OPERATION

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3.9.2 As a minimum, two source range neutron flux monitors shall be OPERABLE and operating, each with continuous visual indication in the control room and one with audible indication in the containment and control room.

APPLICABILITY: MODE 6.

ACTION:

- a. With one of the above required monitors inoperable or not operating, immediately suspend all operations involving CORE ALTERATIONS or operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of Technical Specification 3.9.1.
- b. With both of the above required monitors inoperable or not operating, determine the boron concentration of the Reactor Coolant System at least once per 12 hours.

#### SURVEILLANCE REQUIREMENTS

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4.9.2 Each source range neutron flux monitor shall be demonstrated OPERABLE by performance of:

- a. A CHANNEL CHECK at least once per 12 hours,
- b. A CHANNEL FUNCTIONAL TEST within 8 hours prior to the initial start of CORE ALTERATIONS, and
- c. A CHANNEL FUNCTIONAL TEST at least once per 7 days.

## REFUELING OPERATIONS

### 3/4.9.8 SHUTDOWN COOLING AND COOLANT CIRCULATION

#### HIGH WATER LEVEL

#### LIMITING CONDITION FOR OPERATION

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3.9.8.1 At least one shutdown cooling train shall be OPERABLE and in operation.\*

APPLICABILITY: MODE 6 when the water level above the top of the fuel seated in the reactor pressure vessel is greater than or equal to 23 feet.

#### ACTION:

With no shutdown cooling train OPERABLE and in operation, suspend all operations involving an increase in the reactor decay heat load or operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of Technical Specification 3.9.1 and immediately initiate corrective action to return the required shutdown cooling train to OPERABLE and operating status. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

#### SURVEILLANCE REQUIREMENTS

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4.9.8.1 At least one shutdown cooling train shall be verified to be in operation and circulating reactor coolant at a flow rate of greater than or equal to 4000 gpm\*\* at least once per 12 hours.

\*The shutdown cooling loop may be removed from operation for up to 1 hour per 8-hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor pressure vessel hot legs, provided no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the minimum required boron concentration of Technical Specification 3.9.1.

\*\*The minimum flow may be reduced to 3000 gpm after the reactor has been shut down for greater than or equal to 175 hours or by verifying at least once per hour that the RCS temperature is less than 135°F. The minimum flow may be reduced to 2000 gpm after the reactor has been shut down for greater than or equal to 375 hours.

## REFUELING OPERATIONS

### LOW WATER LEVEL

#### LIMITING CONDITION FOR OPERATION

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3.9.8.2 Two<sup>#</sup> independent shutdown cooling trains shall be OPERABLE and at least one shutdown cooling train shall be in operation.\*

**APPLICABILITY:** MODE 6 when the water level above the top of the fuel seated in the reactor pressure vessel is less than 23 feet.

#### ACTION:

- a. With one of the required shutdown cooling trains inoperable, immediately initiate corrective action to return the required train to OPERABLE status, or to establish greater than or equal to 23 feet of water above the top of the fuel seated in the reactor pressure vessel.
- b. With no shutdown cooling train OPERABLE and in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of Technical Specification 3.9.1 and immediately initiate corrective action to return the required shutdown cooling train to OPERABLE and operating status. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

#### SURVEILLANCE REQUIREMENTS

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4.9.8.2 At least one shutdown cooling train shall be verified to be in operation and circulating reactor coolant at a flow rate of greater than or equal to 4000 gpm\*\* at least once per 12 hours.

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#Only one shutdown cooling train is required to be OPERABLE and in operation provided there are no irradiated fuel assemblies seated within the reactor pressure vessel.

\*The shutdown cooling loop may be removed from operations for up to 1 hour per 8-hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor pressure vessel hot legs, provided no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the minimum required boron concentration of Technical Specification 3.9.1.

\*\*The minimum flow may be reduced to 3000 gpm after the reactor has been shut down for greater than or equal to 175 hours or by verifying at least once per hour that the RCS temperature is less than 135°F. The minimum flow may be reduced to 2000 gpm after the reactor has been shut down for greater than or equal to 375 hours.