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Waterford 3

W3F1-2002-0095

October 24, 2002

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

**SUBJECT:** Waterford Steam Electric Station, Unit 3  
Docket No. 50-382  
License Amendment Request NPF-38-243  
Reactivity/Boron Concentration Changes

Dear Sir or Madam:

Pursuant to 10CFR50.90, Entergy Operations, Inc. (Entergy) hereby requests the following amendment for Waterford Steam Electric Station, Unit 3 (Waterford 3). The proposed amendment would revise Technical Specifications relating to positive reactivity additions while in shutdown modes by clarifying Technical Specifications involving positive reactivity additions. The proposed changes are based on Technical Specifications Task Force (TSTF) -286, Revision 2 and allow for small, controlled, safe insertions of positive reactivity while in shutdown modes. In addition to the TSTF-286 related changes, two additional changes are proposed. The borated water volume requirements in Technical Specification 3.1.2.7 will now be presented in only one set of units (% level) and an obsolete reference will be deleted from Surveillance Requirement 4.8 2.2. Both of these additional changes are administrative changes.

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1) using criteria in 10CFR50.92(c) and it has been determined that this change involves no significant hazards considerations. The bases for these determinations are included in Attachment 1. Attachments 2 and 3 contain the affected Technical Specification and Bases pages marked up to show the proposed changes. The Bases pages are provided for information only.

The proposed change does not include any new commitments. The NRC has approved similar Technical Specification changes for other plants. A change approved in amendment 122 for St. Lucie, Unit 2, (docket number 50-389) is very similar to the change requested for Waterford 3.

Entergy requests approval of the proposed amendment by September 12, 2003 so that the changes can be implemented for Waterford 3's Fall 2003 outage. Once approved, the amendment shall be implemented within 60 days

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If you have any questions or require additional information, please contact D. Bryan Miller at 504-739-6692.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 24, 2002.

Sincerely,

A handwritten signature in black ink that reads "Joe Venable". The signature is written in a cursive style with a large, looped initial "J".

J. E. Venable  
Vice President, Operations  
Waterford Steam Electric Station, Unit 3

JEV/DBM/cbh

Attachments:

1. Analysis of Proposed Technical Specification Change
2. Proposed Technical Specification Changes (mark-up)
3. Changes to TS Bases pages (For Information Only)

cc: E.W. Merschoff, NRC Region IV  
N. Kalyanam, NRC-NRR  
J. Smith  
N.S. Reynolds  
NRC Resident Inspectors Office  
Louisiana DEQ/Surveillance Division  
American Nuclear Insurers

**Attachment 1**

**W3F1-2002-0095**

**Analysis of Proposed Technical Specification Change**

## 1.0 DESCRIPTION

This letter is a request to amend Operating License(s) NPF-38 for Waterford Steam Electric Station, Unit 3 (Waterford 3).

The proposed changes will revise the Operating License requirements related to positive reactivity additions while in shutdown modes. The proposed changes allow small, controlled, safe insertions of positive reactivity while in shutdown modes.

## 2.0 PROPOSED CHANGE

The proposed TS changes revise actions that either require suspension of operations involving positive reactivity additions, or preclude introduction of water with a boron concentration less than the reactor coolant system (RCS). The proposed changes would instead limit the introduction into the RCS of reactivity more positive than that required to meet the required shutdown margin (SDM) or refueling boron concentrations, as applicable. These changes are being made to the following TS.

TS	Page
3.1.2.1	3/4 1-6
3.1.2.3	3/4 1-8
3.1.2.5	3/4 1-10
3.1.2.7	3/4 1-12
3.3.1	3/4 3-6
3.4.1.2	3/4 4-2
3.4.1.3	3/4 4-3
3.4.1.4	3/4 4-5
3.4.1.5	3/4 4-6
3.8.1.2	3/4 8-8
3.8.2.2	3/4 8-12
3.8.3.2	3/4 8-15
3.9.2	3/4 9-2
3.9.8.1	3/4 9-8
3.9.8.2	3/4 9-9

An additional change is proposed for TS 3.1.2.7, Borated Water Sources – Shutdown. This TS currently presents borated water volume requirements in both gallons and percent level. The TS will be revised such that required borated water volumes are specified in percent level only.

An additional administrative change is proposed to Surveillance Requirement (SR) 4.8.1.2 to delete an obsolete reference to SR 4.8.1.1.3.

## 3.0 BACKGROUND

The actions that preclude positive reactivity changes and/or reduction in boron concentration are intended to ensure no power increases occur and that SDM is maintained. During conditions in which these actions may be required by current TSs, various unit operations must be continued. RCS inventory must be maintained and RCS temperature must be controlled. These activities involve addition to the RCS of water at a temperature different than that of the

RCS, may involve slight RCS temperature changes, and may involve inventory makeup from sources that are at boron concentrations less than RCS concentration. These activities may constitute small positive reactivity changes that are precluded by the current TS. However, these activities should not be precluded if the worst-case overall effect on the core would still assure SDM is maintained. Therefore, the proposed changes provide the flexibility necessary to provide for continued safe reactor operations, while also limiting any potential for excessive positive reactivity addition.

The industry and the Nuclear Regulatory Commission (NRC) staff have been working through the Technical Specifications Task Force (TSTF) to develop generic changes for Standard Technical Specifications, known as TSTFs. The TSTFs, once approved by the NRC, can be used as models by licensees in amendment requests. The proposed TS changes are based on the TSTF process. The proposed changes conform closely to TSTF-286 Rev. 2 of the industry TSTF. TSTF-286 Rev. 2 revises most actions requiring "Suspend operations involving positive reactivity additions" to allow minimum reactivity additions due to temperature fluctuations or operations which are necessary to maintain fluid inventory within the required shutdown margin (SDM) or refueling boron concentration, as applicable. TSTF-286 Rev. 2 was approved by the NRC staff in a letter dated July 6, 2000 (W. D. Beckner, USNRC, to J. Davis, Nuclear Energy Institute).

#### 4.0 TECHNICAL ANALYSIS

TS page mark ups for the proposed changes are in Attachments 2. The Waterford 3 TSs do not conform with the Standard Technical Specifications (STS) format. Therefore there are administrative differences between the wording and format Entergy proposes and the exact wording and format for the TS changes approved by TSTF-286, Rev. 2. However, the proposed changes remain valid, and substantial deviations with TSTF-286 Rev. 2 are described and justified below.

TS 3.1.2.1, Boration Systems, Flow Paths - Shutdown, TS 3.1.2.3, Charging Pumps - Shutdown, TS 3.1.2.5, Boric Acid Makeup Pumps - Shutdown, and TS 3.1.2.7, Borated Water Sources - Shutdown, currently prohibit the addition of any positive reactivity to the reactor while in shutdown Modes 5 and 6. Since temperature changes in the RCS impose reactivity changes by means of the moderator temperature coefficient, this TS revision will allow plant temperature changes provided the temperature change is accounted for in the calculated SDM. Small changes in RCS temperature are unavoidable and so long as the required SDM is maintained during these changes, any positive reactivity additions will be limited to acceptable levels. In order to maintain consistency with the existing TSs, the term positive reactivity additions will be annotated by an asterisk instead of a note, with the asterisk wording comparable to that used for insert 2 of TSTF-286, Rev. 2. This is a plant-specific change because NUREG-1432 has no equivalent TS for boration sources and flowpaths. The proposed wording for the TS change is consistent with the wording approved for license amendments 175 and 166 for San Onofre Units 2 and 3 (docket numbers 50-361 and 50-362) and license amendments 179 and 122 for St. Lucie Units 1 and 2 (docket numbers 50-335 and 50-389).

Additionally, TS 3.1.2.7, Borated Water Sources – Shutdown, currently contains borated water volume requirements in both gallons and percent level. TS 3.1.2.7 will be revised such that required borated water volumes are specified in percent level only. Control Room level indications for the boric acid makeup tank (BAMT) and refueling water storage pool (RWSP) are

provided in percent level. Operations personnel use percent level to verify TS 3.1.2.7 compliance and do not have direct indication of BAMT and RWSP levels in gallons. A review of the BAMT and RWSP level calculations has revealed a conservative difference between the gallons and percent level requirements as specified in TS 3.1.2.7. In both cases the percent level requirement converts to a greater number of gallons than the gallons requirement listed and therefore bounds both values listed in TS 3.1.2.7. Therefore the proposed change is an administrative change.

TS Table 3.3-1, Reactor Protective Instrumentation, action 4 for the logarithmic power level - high shutdown requirements currently prohibits any positive reactivity additions to the shutdown reactor. This TS would be modified by a note allowing controlled plant operations that may result in limited reactivity additions (e.g., temperature or boron fluctuations associated with RCS inventory management or temperature control) provided they are accounted for in the calculated SDM. This would maintain the required SDM and limit any potential reactivity additions to acceptable levels. In order to maintain consistency with the existing TSs, the term positive reactivity additions will be annotated by an asterisk instead of a note, with the asterisk wording identical to that used for insert 1 of TSTF-286, Rev. 2. Although there are differences in instrumentation nomenclature and mode applicability, the proposed change meets the intent of the TSTF-286 change associated with TS 3.3.13 with regard to the logarithmic power monitoring channels.

TS 3.4.1.2, Reactor Coolant System - Hot Standby, TS 3.4.1.3, Reactor Coolant System - Hot Shutdown, TS 3.4.1.4, Reactor Coolant System - Cold Shutdown - Loops Filled, TS 3.4.1.5, Reactor Coolant System - Cold Shutdown - Loops Not Filled, TS 3.9.8.1, Refueling Operations - Shutdown Cooling and Coolant Circulation - High Water Level, and TS 3.9.8.2, Refueling Operations - Low Water Level currently prohibit operations that would cause any reduction of the RCS boron concentration. These TSs would be revised to prohibit operations that would cause introduction into the RCS of coolant with boron concentration less than that which would meet SDM requirements. The revision would allow introduction into the RCS of coolant at a lower boron concentration than the RCS provided the lower concentration is greater than or equal to the concentration required to preserve the required SDM.

Additions of makeup water to the RCS are routinely required. If the makeup water is at a lower boron concentration than the RCS, it would result in a positive reactivity addition. In addition, water in the refueling water storage pool of the same boron concentration as the RCS may appear to be at a slightly lower boron concentration due to chemistry sampling uncertainties. However, makeup to the RCS under these circumstances is a safe operation provided the makeup boron concentration is greater than or equal to the concentration required to preserve the required SDM.

The proposed TS changes are similar to those approved in TSTF-286 Rev. 2 except that Technical Specifications 3.1.1 and 3.1.2 are not combined as assumed in TSTF-286 Rev. 2. For Waterford 3, the equivalent Technical Specifications are 3.1.1.1 and 3.1.1.2. Additionally, TS 3.9.8.2 contains a note identical to the note in TS 3.9.8.1 regarding removal of the shutdown cooling loop from operation for short periods of time during core alterations. The note in TS 3.9.8.1 is consistent with the note in TSTF-286 Rev. 2 TS 3.9.4. To meet the intent of TSTF-286 Rev. 2, the note in TS 3.9.8.2 will be revised to be consistent with the changes proposed to TS 3.9.8.1. Otherwise, the proposed TS changes are comparable with TSTF-286 Rev. 2.

TS 3.8.1.2, AC Sources - Shutdown, TS 3.8.2.2, DC Sources - Shutdown, TS 3.8.3.2, Onsite Power Distribution - Shutdown, and TS 3.9.2, Refueling Operations, Instrumentation currently require suspension of operations involving positive reactivity additions under certain conditions. These TSs would be modified to suspend operations involving positive reactivity additions only if they could result in loss of required SDM or required boron concentration. Small, controlled, safe insertions of positive reactivity would be allowed. The proposed changes are comparable to those changes approved in TSTF-286 Rev. 2.

Additionally, SR 4.8.1.2, AC Sources – Shutdown, will be revised to eliminate the reference to 4.8.1.1.3. SR 4.8.1.1.3 was previously deleted by amendment 132 making its reference in SR 4.8.1.2 obsolete. Therefore this proposed change is an administrative change.

The initial assumptions of the most limiting accident analysis and any positive reactivity additions resulting from the proposed changes remain bounded by the Final Safety Analysis Report accident analysis, specifically the inadvertent boron dilution and slow positive reactivity insertion events. Waterford 3 plant systems and procedures, currently in place, properly monitor the overall effect on core reactivity and the required SDM, and maintain the required refueling boron concentration.

## Conclusion

As discussed above, these proposed TS changes are based on TSTF-286, Rev.2. These changes revise actions that either require suspension of operations involving positive reactivity additions, or preclude reduction in RCS boron concentration. The proposed changes instead limit the introduction into the RCS of reactivity more positive than that required to meet the required SDM or refueling boron concentrations, as applicable. The operational flexibility allowed in these proposed license amendments will be performed under strict administrative controls in order to limit the potential for excessive positive reactivity addition. Therefore, the changes are acceptable.

## 5.0 REGULATORY ANALYSIS

### 5.1 Applicable Regulatory Requirements/Criteria

The proposed changes have been evaluated to determine whether applicable regulations and requirements continue to be met.

Entergy has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the TS, and do not affect conformance with any GDC differently than described in the SAR.

### 5.2 No Significant Hazards Consideration

The proposed license amendments to Facility Operating Licenses NPF-38 for Waterford Steam Electric Station, Unit 3 (Waterford 3) would allow small, controlled, safe insertions of positive reactivity while in shutdown modes. The proposed changes conform closely to the industry and NRC approved TSTF-286 Rev. 2.

Entergy Operations, Inc. (Entergy) has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No.

The proposed Technical Specification (TS) changes revise actions that either require suspension of operations involving positive reactivity additions or preclude reduction in boron concentration less than the reactor coolant system (RCS). Reactivity excursions are analyzed events. The proposed changes limit positive reactivity additions into the RCS such that the required shutdown margin (SDM) or refueling boron concentration continue to be met. Reactivity changes performed during shutdown modes are currently governed by strict administrative controls. Although the proposed changes will allow procedural flexibility with regards to RCS temperature and boron concentration, these operations will still be under administrative control. The changes proposed by these amendments are within the scope and assumptions of the existing analyses.

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

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

Response: No.

The proposed TS revisions relate to positive reactivity additions while in shutdown modes of operation. Reactivity excursions are analyzed events. The operational flexibility allowed in these proposed license amendments will be performed under strict administrative controls in order to limit the potential for excessive positive reactivity addition. Although the existing procedural controls will need modification, no new or different operational failure modes will be introduced by these changes.

Additionally, implementation of these proposed changes does not require any physical plant modifications, so no new or different hardware-related failure modes are introduced. The changes proposed by these amendments are within the scope and assumptions of the existing analyses.

Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

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

Response: No.

The proposed changes conform closely to the industry and NRC approved TSTF-286 Rev. 2 and relate to small, controlled, safe insertions of positive reactivity additions while in shutdown modes. These changes revise actions that either require suspension of operations involving positive reactivity additions, or prohibit RCS boron concentration reduction. The proposed changes provide operational flexibility while controlling positive reactivity additions. The proposed changes provide for continued safe reactor operations and preserve the required SDM or refueling boron concentration.

Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

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

### 5.3 Environmental Considerations

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

### 6.0 PRECEDENCE

Similar TS changes have been approved for Combustion Engineering plants in license amendments 175 and 166 for San Onofre Units 2 and 3 (docket numbers 50-361 and 50-362) and license amendments 179 and 122 for St. Lucie Units 1 and 2 (docket numbers 50-335 and 50-389). The proposed TS changes for Waterford 3 are most similar to the changes approved for St. Lucie Unit 2 except that Waterford 3 TS 3.7.6.2 does not contain a requirement for the suspension of positive reactivity changes comparable to St. Lucie Unit 2 TS 3.7.7, Mode 5 and 6, Action b. This specific requirement was previously revised by Waterford 3 amendment 149.

**Attachment 2**

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**Proposed Technical Specification Changes (mark-up)**

INSERT 1

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

INSERT 2

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

INSERT 3

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.

INSERT 4

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

INSERT 5

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.

INSERT 6

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 3.9.1.

INSERT 7

operations involving positive reactivity additions that could result in loss of required SHUTDOWN MARGIN or boron concentration

INSERT 8

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.

INSERT 9

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.

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.

\* Insert 2

REACTIVITY CONTROL SYSTEMS

CHARGING PUMPS - SHUTDOWN

LIMITING CONDITION FOR OPERATION

---

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.

\* Insert 2

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.

\* Insert 2

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - SHUTDOWN

LIMITING CONDITION FOR OPERATION

---

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 ~~4150~~<sup>g</sup> gallons (36% indicated level).
- b. The refueling water storage pool (RWSP) with:
  1. A minimum contained borated water volume of ~~65,465~~<sup>g</sup> gallons (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

---

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.

\* Insert 2

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.
  - 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

*\* Insert 1*

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 all operations involving a reduction in boron concentration of the Reactor Coolant System~~ and immediately initiate corrective action to return the required reactor coolant loop to operation. Insert 3

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 dilution of the Reactor Coolant System boron concentration,~~ and (2) core outlet temperature is maintained at least 10°F below saturation temperature. Insert 5

\*\*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, <sup>Insert 3</sup>  
~~suspend~~  
~~all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action~~  
to return the required coolant loop to operation.

~~\*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 dilution of the Reactor Coolant System boron concentration, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.~~ <sup>Insert 5</sup>

\*\*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

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 all operations involving a reduction in boron concentration of the Reactor Coolant System~~ and immediately initiate corrective action to return the required coolant loop to operation.

Insert 8

SURVEILLANCE REQUIREMENTS

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.

Insert 9

\*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 dilution of the Reactor Coolant System boron concentration,~~ 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 all operations involving a reduction in boron concentration of the Reactor Coolant System~~ and immediately initiate corrective action to return the required shutdown cooling loop to operation.

Insert 8

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 dilution of the Reactor Coolant System boron concentration,~~ and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

Insert 9

ELECTRICAL POWER SYSTEMS

A.C. SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

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, ~~positive reactivity changes~~, 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.

Insert 7

SURVEILLANCE REQUIREMENTS

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.) ~~and 4.8.1.1.3.~~

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:

- Insert 7*
- a. With the required battery bank inoperable, immediately suspend all operations involving CORE ALTERATIONS, ~~positive reactivity changes~~ 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, ~~positive reactivity changes~~, or movement of irradiated fuel, initiate corrective action to energize the required electrical busses in the specified manner as soon as possible.

*Insert 7.*

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:

- Insert 4*
- a. With one of the above required monitors inoperable or not operating, immediately suspend all operations involving CORE ALTERATIONS or ~~positive reactivity changes.~~
  - 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

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 a reduction in boron concentration of the ~~Reactor Coolant System~~ 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.

Insert 4

SURVEILLANCE REQUIREMENTS

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

Insert 6

\*\*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

3.9.8.2 Two# 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 selected in the reactor pressure vessel.
- b. With no shutdown cooling train OPERABLE and in operation, suspend all ~~operations involving a reduction in boron concentration of the Reactor Coolant System~~ 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.

Insert 4

SURVEILLANCE REQUIREMENTS

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.

#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

Insert 6

\*\*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.

**Attachment 3**

**W3F1-2002-0095**

**Changes to Technical Specification Bases Pages**

**(For Information Only)**

INSERT B1

If no coolant loops are in operation during shutdown operations, suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1.1 or 3.1.1.2, as applicable, is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that which 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.

INSERT B2

Temperature changes in the RCS impose reactivity changes by means of the moderator temperature coefficient. Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SDM. This will require a new SDM calculation be performed if the current SDM calculation does not bound the temperature change. Small changes in RCS temperature are unavoidable and so long as the required SDM is maintained during these changes, any positive reactivity additions will be limited to acceptable levels. Introduction of temperature changes must be evaluated to ensure they do not result in a loss of required SDM.

INSERT B3

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. 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. Suspension of CORE ALTERATIONS or positive reactivity additions shall not preclude moving a component to a safe position.

INSERT B4

If SDC loop requirements are not met, there will be no forced circulation to provide mixing to establish uniform boron concentrations. 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 which 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 operations.

INSERT B5

With the minimum AC and DC power sources and associated distribution systems inoperable the ACTION requires the immediate suspension of various activities including operations involving positive reactivity additions that could result in loss of required SHUTDOWN MARGIN (MODE 5) or boron concentration (MODE 6.) Suspending positive reactivity additions that could result in failure to meet the minimum SHUTDOWN MARGIN 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 SHUTDOWN MARGIN or refueling concentration. This may result in an overall reduction in boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes, including increases when operating with a positive moderator temperature coefficient, must also be evaluated to ensure they do not result in a loss of required SHUTDOWN MARGIN. Suspension of these activities does not preclude completion of actions to establish a safe conservative condition.

## REACTIVITY CONTROL SYSTEMS

### BASES

#### 3/4.1.1.4 MINIMUM TEMPERATURE FOR CRITICALITY

This specification ensures that the reactor will not be made critical with the Reactor Coolant System cold leg temperature less than 520°F. This limitation is required to ensure (1) the moderator temperature coefficient is within its analyzed temperature range, (2) the protective instrumentation is within its normal operating range, (3) the pressurizer is capable of being in an OPERABLE status with a steam bubble, (4) the reactor pressure vessel is above its minimum  $RT_{DOT}$  temperature, and (5) the ECCS analysis remains valid for the peak linear heat rate of Specification 3.2.1.

#### 3/4.1.2 BORATION SYSTEMS

The boron injection system ensures that negative reactivity control is available during each mode of facility operation. The components required to perform this function include (1) borated water sources, (2) charging pumps, (3) separate flow paths, (4) boric acid makeup pumps, (5) associated heat tracing systems, and (6) an emergency power supply from OPERABLE diesel generators.

With the RCS average temperature above 200°F, a minimum of two separate and redundant boron injection systems are provided to ensure single functional capability in the event an assumed failure renders one of the systems inoperable. Allowable out-of-service periods ensure that minor component repair or corrective action may be completed without undue risk to overall facility safety from injection system failures during the repair period.

The boration capability of either system is sufficient to provide a SHUT-DOWN MARGIN from expected operating conditions of 2.0% delta k/k after xenon decay and cooldown to 200°F. The maximum expected boration capability requirement occurs at EOL from full power equilibrium xenon conditions assuming the most reactive CEA stuck out of the core and requires boric acid solution from the boric acid makeup tanks in the allowable concentrations and volumes of Specification 3.1.2.8 plus approximately 19,000 gallons of 2050 ppm borated water from the refueling water storage pool or approximately 58,000 gallons of 2050 ppm borated water from the refueling water storage pool alone. The higher limit of 447,100 gallons is specified to be consistent with Specification 3.5.4 in order to meet the ECCS requirements.

With the RCS temperature below 200°F one injection system is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity changes in the event the single injection system becomes inoperable. *Insert B2*

The boron capability required below 200°F is based upon providing a 2% delta k/k SHUTDOWN MARGIN after xenon decay and cooldown from 200°F to 140°F. This condition requires either 5,465 gallons of 2050 ppm borated water from the refueling water storage pool or boric acid solution from the boric acid makeup tanks in accordance with the requirements of Specification 3.1.2.7.

### 3/4.4 REACTOR COOLANT SYSTEM

#### BASES

#### 3/4.4.1 REACTOR COOLANT LOOPS AND COOLANT CIRCULATION

The plant is designed to operate with both reactor coolant loops and associated reactor coolant pumps in operation, and maintain DNBR above 1.20 during all normal operations and anticipated transients. In MODES 1 and 2 with one reactor coolant loop not in operation, this specification requires that the plant be in at least HOT STANDBY within 1 hour.

In MODE 3, a single reactor coolant loop provides sufficient heat removal capability for removing decay heat; however single failure considerations require that two loops be OPERABLE.

In MODE 4, and in MODE 5 with reactor coolant loops filled, a single reactor coolant loop or shutdown cooling train provides sufficient heat removal capability for removing decay heat; but single failure considerations require that at least two loops or trains (either shutdown cooling or RCS) be OPERABLE.

In MODE 5 with reactor coolant loops not filled, a single shutdown cooling train provides sufficient heat removal capability for removing decay heat; but single failure considerations, and the unavailability of the steam generators as a heat removing component, require that at least two shutdown cooling trains be OPERABLE.

The operation of one reactor coolant pump or one shutdown cooling (low pressure safety injection) pump provides adequate flow to ensure mixing, prevent stratification and produce gradual reactivity changes during boron concentration reductions in the Reactor Coolant System. The reactivity change rate associated with boron reductions will, therefore, be within the capability of operator recognition and control. Insert B1

The restrictions on starting a reactor coolant pump in MODES 4 and 5, with one or more RCS cold legs less than or equal to 272°F are provided to prevent RCS pressure transients, caused by energy additions from the secondary system, which could exceed the limits of Appendix G to 10 CFR Part 50. The RCS will be protected against overpressure transients and will not exceed the limits of Appendix G by either (1) restricting the water volume in the pressurizer and thereby providing a volume for the primary coolant to expand into or (2) by restricting starting of the RCPs to when the secondary water temperature of each steam generator is less than 100°F above each of the RCS cold leg temperatures.

#### 3/4.4.2 SAFETY VALVES

The pressurizer code safety valves operate to prevent the RCS from being pressurized above its Safety Limit of 2750 psia. Each safety valve is designed to relieve  $4.6 \times 10^5$  lbs per hour of saturated steam at the valve setpoint. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown. In the event that no safety

ELECTRICAL POWER SYSTEMS

BASES

3/4.8.1, 3/4.8.2, and 3/4.8.3 A.C. SOURCES, D.C SOURCES, AND ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

72 hours begins with the discovery of the TEDG unavailability, not to exceed a total of 10 days from the time the EDG originally became inoperable. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components, and devices that depend on the remaining OPERABLE diesel generator as a source of emergency power are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss-of-offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the Surveillance Requirements needed to demonstrate the OPERABILITY of the component.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that (1) the facility can be maintained in the shutdown or refueling condition for extended time periods and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

Inset B5

### 3/4.9 REFUELING OPERATIONS

#### BASES

#### 3/4.9.1 BORON CONCENTRATION

The limitations on reactivity conditions during REFUELING ensure that: (1) the reactor will remain subcritical during CORE ALTERATIONS, and (2) a uniform boron concentration is maintained for reactivity control in the water volume having direct access to the reactor vessel. These limitations are consistent with the initial conditions assumed for the boron dilution incident in the safety analyses. The  $K_{eff}$  value specified in the COLR includes a 1% delta k/k conservative allowance for uncertainties. Similarly, the boron concentration value specified in the COLR also includes a conservative uncertainty allowance of 50 ppm boron.

*Insert B3*

#### 3/4.9.2 INSTRUMENTATION

The OPERABILITY of the source range neutron flux monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

#### 3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor pressure vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short lived fission products. This decay time is consistent with the assumptions used in the safety analyses.

#### 3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

The requirements on containment penetration closure and OPERABILITY ensure that a release of radioactive material within containment will be restricted from leakage to the environment. The OPERABILITY and closure restrictions are sufficient to restrict radioactive material release from a fuel element rupture based upon the lack of containment pressurization potential while in the REFUELING MODE.

The equipment door, personnel airlock doors, or penetrations may be open during movement of irradiated fuel in the containment and during CORE ALTERATIONS provided the equipment door, a minimum of one door in the airlock, and penetrations are capable of being closed in the event of a fuel handling accident. Should a fuel handling accident occur inside containment, the equipment door, a minimum of one personnel airlock and the open penetrations will be closed as part of an evacuation of containment. For closure, the equipment door will be held in place by a minimum of four symmetrically-placed bolts.

#### 3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity condition during CORE ALTERATIONS.

## REFUELING OPERATIONS

### BASES

#### 3/4.9.6 REFUELING MACHINE

The OPERABILITY requirements for the refueling machine ensure that: (1) the refueling machine will be used for movement of CEAs and fuel assemblies, (2) each hoist has sufficient load capacity to lift a CEA or fuel assembly, and (3) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

#### 3/4.9.7 CRANE TRAVEL - FUEL HANDLING BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel assembly, CEA, and associated handling tool over other irradiated fuel assemblies in the Fuel Handling Building ensures that in the event this load is dropped (1) the activity release will be limited to that contained in a single fuel assembly, and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the safety analyses.

#### 3/4.9.8 SHUTDOWN COOLING AND COOLANT CIRCULATION

The requirement that at least one shutdown cooling train be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the REFUELING MODE, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effects of a boron dilution incident and prevent boron stratification. *Insert B4*

The requirement to have two shutdown cooling trains OPERABLE when there is less than 23 feet of water above the top of the fuel seated in the reactor pressure vessel, ensures that a single failure of the operating shutdown cooling train will not result in a complete loss of decay heat removal capability. When there is no irradiated fuel in the reactor pressure vessel, this is not a consideration and only one shutdown cooling train is required to be OPERABLE. With the reactor vessel head removed and 23 feet of water above the top of the fuel seated in the reactor pressure vessel, a large heat sink is available for core cooling, thus in the event of a failure of the operating shutdown cooling train, adequate time is provided to initiate emergency procedures to cool the core.

#### 3/4.9.9 CONTAINMENT PURGE VALVE ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment purge valves will be automatically isolated upon detection of high radiation levels within the containment. The OPERABILITY of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.