Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

August 22, 2001

L-2001-093
10 CFR 50.90

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

RE: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Proposed License Amendments
Reactivity/Boron Concentration Changes

Pursuant to 10 CFR 50.90, Florida Power and Light Company (FPL) requests to amend Facility Operating Licenses DPR-67 for St. Lucie Unit 1 and NPF-16 for St. Lucie Unit 2 by incorporating the attached Technical Specifications (TS) revisions. The proposed amendments would revise TSs relating to positive reactivity additions while in shutdown modes by clarifying TSs involving positive reactivity additions. The proposed changes are based on TSTF-286, Revision 2 and allow for small, controlled, safe insertions of positive reactivity while in shutdown modes.

Attachment 1 is an evaluation of the proposed changes. Attachment 2 is the "Determination of No Significant Hazards Consideration." Attachments 3 and 4 contain copies of the affected Technical Specifications pages marked up to show the proposed changes.

The St. Lucie Facility Review Group and the FPL Company Nuclear Review Board have reviewed the proposed amendments. In accordance with 10 CFR 50.91(b)(1), copies of the proposed amendments are being forwarded to the State Designee for the State of Florida.

Although these amendments would facilitate upcoming refueling outages, there is no requested approval date. Please issue the amendment to be effective on the date of issuance and to be implemented within 60 days of receipt by FPL.

A001

Please contact us if there are any questions about this submittal.

Very truly yours,

Donald E. Jernigan
Vice President
St. Lucie Plant

RSK/EJW/KWF

Attachments

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant
Mr. W. A. Passetti, Florida Department of Health and Rehabilitative Services

STATE OF FLORIDA)
) ss.
COUNTY OF ST. LUCIE)

Donald E. Jernigan, being first duly sworn, deposes and says:

That he is Vice President, St. Lucie Plant, for the Nuclear Division of Florida Power and Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information and belief, and that he is authorized to execute the document on behalf of said Licensee.

Donald E. Jernigan

STATE OF FLORIDA

COUNTY OF St. Lucie

Sworn to and subscribed before me

this 20 day of August, 20 01

by Donald E. Jernigan, who is personally known to me.

Leslie J. Whitwell

Signature of Notary Public-State of Florida

Leslie J. Whitwell
MY COMMISSION # DD020212 EXPIRES
May 12, 2005
BONDED THRU TROY FAIN INSURANCE, INC.

Name of Notary Public (Print, Type, or Stamp)

EVALUATION OF PROPOSED TS CHANGES

EVALUATION OF PROPOSED TS CHANGES

Introduction

Florida Power and Light Company (FPL) requests to amend Facility Operating Licenses DPR-67 for St. Lucie Unit 1 and NPF-16 for St. Lucie Unit 2 by incorporating the attached Technical Specifications (TS) revisions. The proposed amendments would revise TSs relating to positive reactivity additions while in shutdown modes. The proposed changes clarify TSs involving positive reactivity additions to the shutdown reactor. The proposed changes would allow small, controlled, safe insertions of positive reactivity while in shutdown modes.

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).

Evaluation

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 SDM or refueling boron concentrations, as applicable.

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 necessarily 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 excess positive reactivity addition.

TS Change Justification and Description

TS page mark ups for the proposed changes are in Attachments 3 (Unit 1) and 4 (Unit 2). Differences between Units 1 and 2 are delineated by square brackets (i.e., [Unit 2]). The St. Lucie Units 1 and 2 TSs do not conform with the Standard Technical Specifications (STS) format. Therefore there are administrative differences between the wording and format FPL proposes and the exact wording and format for the TS changes approved by TSTF-286, Rev. 2. However, the proposed changes remain valid, and the 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).

[For Unit 2 only, TS Table 3.3-1, Reactor Protection Instrumentation, action 3 for the wide range logarithmic neutron flux monitor 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 changes meet the intent of the TSTF-286 changes associated with TSs 3.3.9 and 3.3.10 with regard to wide range nuclear instrumentation].

[For Unit 2 only, TS 3.7.7, Control Room Emergency Air Cleanup System (CREACS), currently prohibits any positive reactivity additions to the shutdown reactor if both trains of CREACS are inoperable in Modes 5 or 6. 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 comparable to that used for Insert 1 of TSTF-286, Rev. 2. TSTF-286, Rev. 2 places this change in Section 3, or the instrumentation section of the TS. However, for St. Lucie Unit 2, positive reactivity changes are only discussed in TS 3.7.7, so the proposed change belongs in TS 3.7.7. Therefore, the proposed change meets the intent of TSTF-286 with regard to control room ventilation].

TS 3.4.1.2, Reactor Coolant System – Hot Standby, TS 3.4.1.3, Reactor Coolant System – Hot Shutdown, TS 3.4.1.4.1, Reactor Coolant System – Cold Shutdown – Loops Filled, TS 3.4.1.4.2, 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 – Shutdown Cooling and Coolant Circulation – 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 tank 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. Additionally, for St. Lucie, the equivalent Technical Specifications are 3.1.1.1 and 3.1.1.2. Otherwise, the proposed TS changes are comparable with TSTF-286 Rev. 2.

TS 3.8.1.2, AC Sources – Shutdown, [For Unit 2 only 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 boron concentration. Small, controlled, safe insertions of positive reactivity would be allowed. The TS proposed changes are comparable with those changes approved in TSTF-286 Rev. 2.

Additionally, the TS BASES for 3/4.1.2, 3/4/4.1, 3/4.9.1, and 3/4.9.8 will be revised to reflect the proposed TS changes. The proposed BASES wording meets the intent of TSTF-286 and NUREG-1432.

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 boron concentration less than the reactor coolant system (RCS). 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 excess positive reactivity addition. Therefore, the changes are acceptable.

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

Description of amendment request: The proposed license amendments (PLAs) to Facility Operating Licenses DPR-67 for St. Lucie Unit 1 and NPF-16 for St. Lucie Unit 2 relate to positive reactivity additions while in shutdown modes and 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.

Pursuant to 10 CFR 50.92, a determination may be made that a proposed license amendment involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety. Each standard is discussed as follows.

(1) Operation of the facility in accordance with the proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed 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, operation of the facility in accordance with the proposed amendments would not involve a significant increase in the probability or consequences of an accident previously evaluated.

(2) Operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated.

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 excess positive reactivity addition. Although the existing procedural controls will need modification, no new or different operational failure modes would be introduced by these changes.

Additionally, implementation of these proposed changes do 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, operation of the facility in accordance with the proposed amendments would not create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) Operation of the facility in accordance with the proposed amendment would not involve a significant reduction in a margin of safety.

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 in order to preserve the required SDM or refueling boron concentration. The proposed changes to provide for continued safe reactor operations, while also limiting any potential for excess positive reactivity addition. Therefore, operation of the facility in accordance with the proposed amendments would not involve a significant reduction in a margin of safety.

Based on the above discussion and the supporting evaluation of Technical Specification changes, FPL has determined that the proposed license amendments involve no significant hazards consideration.

Environmental Consideration

The proposed license amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The proposed amendments involve no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite, and no significant increase in individual or cumulative occupational radiation exposure. FPL has concluded that the proposed amendments involve no significant hazards consideration and meet the criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and that, pursuant to 10 CFR 51.22(b), an environmental impact statement or environmental assessment need not be prepared in connection with issuance of the amendments.

Conclusion

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

ST. LUCIE UNIT 1 MARKED UP TECHNICAL SPECIFICATION PAGES

3/4 1-8
3/4 1-12
3/4 1-14
3/4 1-16
3/4 4-1a
3/4 4-1b
3/4 4-1d
3/4 4-1e
3/4 8-7
3/4 9-2
3/4 9-8
3/4 9-8a
B 3/4 1-2
B 3/4 4-1
B 3/4 9-1
B 3/4 9-2

INSERT 1 – Not Used

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.

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.

INSERT 6 – Not Used

INSERT 7

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 8

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

INSERT 9

Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specification 3.1.1.2.

INSERT 10

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 3.1.1.2.

REACTIVITY CONTROL SYSTEMS

3/4.1.2 BORATION SYSTEMS

FLOW PATHS - SHUTDOWN

LIMITING CONDITION FOR OPERATION

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 pump or a gravity feed connection and any charging pump to the Reactor Coolant System if only the boric acid makeup tank in Specification 3.1.2.7a is OPERABLE, or

b. The flow path from the refueling water tank via either a charging pump or a high pressure safety injection pump* to the Reactor Coolant System if only the refueling water tank in Specification 3.1.2.7b is OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

With none of the above flow paths OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes until at least one injection path is restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

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

a. 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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* The flow path from the RWT to the RCS via a single HPSI pump shall only be established if: (a) the RCS pressure boundary does not exist, or (b) RCS pressure boundary integrity exists and no charging pumps are operable. In the latter case: 1) all charging pumps shall be disabled; 2) heatup and cooldown rates shall be limited in accordance with Figure 3.1-1b; and 3) at RCS temperatures below 115°F, any two of the following valves in the operable HPSI header shall be verified closed and have their power removed:

High Pressure Header	Auxiliary Header
HCV-3616	HCV-3617
HCV-3626	HCV-3627
HCV-3636	HCV-3637
HCV-3646	HCV-3647

** Insert 2

REACTIVITY CONTROL SYSTEMS

CHARGING PUMPS – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.3 At least one charging pump or 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 bus.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no charging pump or high pressure safety injection pump* OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes and at least one of the required pumps is restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.1.2.3 At least one of the above required pumps shall be demonstrated OPERABLE by verifying the charging pump develops a flow rate of greater than or equal to 40 gpm or the high pressure safety injection pump develops a total head of greater than or equal to 2571 ft. when tested pursuant to the Inservice Testing Program.

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* The flow path from the RWT to the RCS via a single HPSI pump shall be established only if: (a) the RCS pressure boundary does not exist, or (b) RCS pressure boundary integrity exists and no charging pumps are operable. In the latter case: 1) all charging pumps shall be disabled; 2) heatup and cooldown rates shall be limited in accordance with Figure 3.1-1b; and 3) at RCS temperatures below 115°F, any two of the following valves in the operable HPSI header shall be verified closed and have their power removed:

High Pressure Header	Auxiliary Header
HCV-3616	HCV-3617
HCV-3626	HCV-3627
HCV-3636	HCV-3637
HCV-3646	HCV-3647

** Insert 2

REACTIVITY CONTROL SYSTEMS

BORIC ACID PUMPS – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.5 At least one boric acid shall be OPERABLE if only the flow path through the boric acid pump in Specification 3.1.2.1a above, is OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no boric acid pump OPERABLE as required to complete the flow path of Specification 3.1.2.5, suspend all operations involving CORE ALTERATIONS or positive reactivity changes until at least one boric acid pump is restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.1.2.5 The above required boric acid pump shall be demonstrated OPERABLE by verifying that on recirculation flow, the pump develops a discharge pressure of ≥ 75 psig when tested pursuant to the Inservice Testing Program.

* 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 minimum borated water volume of 3650 gallons of 2.5 to 3.5 weight percent boric acid (4371 to 6119 ppm boron).

b. The refueling water tank with:

1. A minimum contained volume of 125,000 gallons,

2. A minimum boron concentration of 1720 ppm, and

3. A minimum solution temperature of 40°F.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no borated water source OPERABLE, suspend all operations involving positive reactivity changes and restore at least one borated water source is restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

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

a. At least once per 7 days by:

1. Verifying the boron concentration of the water,

2. Verifying the water level of the tank, and,

b. At least once per 24 hours by verifying the RWT temperature when it is the source of borated water and the site ambient air temperature is < 40°F.

c. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F by verifying that the Boric Acid Makeup Tank solution temperature is greater than 55°F when that Boric Acid Makeup Tank is required to be OPERABLE.

* Insert 2

REACTOR COOLANT SYSTEM

HOT STANDBY

LIMITING CONDITION FOR OPERATION

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 A and its associated steam generator and at least one associated reactor coolant pump.

b. Reactor Coolant Loop B 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 within one (1) hour initiate corrective action to return the required reactor coolant loop to operation.

Insert 3

SURVEILLANCE REQUIREMENTS

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 generators shall be determined OPERABLE by verifying the secondary side water level to be $\geq$ 10% of narrow range indication at least once per 12 hours.

Insert 5

* All reactor coolant pumps may be de-energized 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.

REACTOR COOLANT SYSTEM

HOT SHUTDOWN

LIMITING CONDITION FOR OPERATION

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

a. Reactor Coolant Loop A and its associated steam generator and at least one associated reactor coolant pump.

b. Reactor Coolant Loop B and its associated steam generator and at least one associated reactor coolant pump.

c. Shutdown Cooling Loop A,

d. Shutdown Cooling Loop B.

APPLICABILITY: MODE 4.

ACTION:

a. With less than the above required reactor coolant or shutdown cooling loops OPERABLE, within one (1) hour initiate corrective action to return the required loops to OPERABLE status. If the remaining OPERABLE loop is a shutdown cooling loop, be in COLD SHUTDOWN within 30 hours.

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 within one (1) hour initiate corrective action to return the required reactor coolant loop to operation.

Insert 3

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* All reactor coolant pumps and shutdown cooling pumps may be de-energized 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

REACTOR COOLANT SYSTEM

COLD SHUTDOWN – LOOPS FILLED

LIMITING CONDITION FOR OPERATION

3.4.1.4.1 At least one shutdown cooling loop shall be OPERABLE and in operation and either:

a. One additional shutdown cooling loop shall be OPERABLE*, or

b. The secondary side water level of at least two steam generators shall be greater than 10% of narrow range indication.

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

ACTION:

a. With less than the above required loops OPERABLE or with less than the required steam generator level, within one (1) hour initiate corrective action to return the required loops to OPERABLE status or to restore the required level.

b. With no shutdown cooling loop in operation, ~~suspend all operations involving a reduction in boron concentration of the Reactor Coolant System~~ and within one (1) hour initiate corrective action to return the required shutdown loop to operation. (Insert 9)

SURVEILLANCE REQUIREMENTS

4.4.1.4.1.1 The secondary side water level of at least two steam generators when required shall be determined to be within limits at least once per 12 hours.

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

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* The shutdown cooling pump may be de-energized 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 10)

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.

A reactor coolant pump shall not be started with two idle loops unless the secondary water temperature of each steam generator is less than 30°F above each of the Reactor Coolant System cold leg temperatures.

REACTOR COOLANT SYSTEM

COLD SHUTDOWN – LOOPS NOT FILLED

LIMITING CONDITION FOR OPERATION

3.4.1.4.2 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, within one (1) hour initiate corrective action to return the required loops to OPERABLE status.

b. With no shutdown cooling loop in operation, ~~suspend all operations involving a reduction in boron concentration of the Reactor Coolant System~~ and within one (1) hour initiate corrective action to return the required shutdown cooling loop to operation.

Insert 9

SURVEILLANCE REQUIREMENTS

4.4.1.4.2 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 may be de-energized 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 10

ELECTRICAL POWER SYSTEMS

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 set with:

1. Engine-mounted fuel tanks containing a minimum of 152 gallons of fuel,

2. A fuel storage system containing a minimum of 18,450 gallons of fuel, 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 irradiated fuel assemblies seated within the reactor vessel, immediately initiate corrective action to restore the required sources to OPERABLE status as soon as possible.

Insert B

SURVEILLANCE REQUIREMENTS

4.8.1.2.1 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 requirement 4.8.1.1.2a.5.

REFUELING OPERATIONS

INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

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

APPLICABILITY: MODE 6.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or ~~positive reactivity changes~~. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

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

a. A CHANNEL FUNCTIONAL TEST at least once per 7 days.

b. A CHANNEL FUNCTIONAL TEST within 8 hours prior to the start of CORE ALTERATIONS, and

c. A CHANNEL CHECK at least once per 12 hours during CORE ALTERATIONS.

REFUELING OPERATIONS

SHUTDOWN COOLING AND COOLANT CIRCULATION

HIGH WATER LEVEL

LIMITING CONDITION FOR OPERATION

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

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

ACTION:

a. With less than one shutdown cooling loop in operation, suspend all operations involving an increase in reactor decay heat load or a ~~reduction in boron concentration of the Reactor Coolant System~~. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours. Insert 4

b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.8.1 At least one shutdown cooling loop shall be verified to be in operation and circulating reactor coolant at a flow rate of greater than or equal to 3000 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 reactor pressure vessel hot legs. Revised Insert 7

REFUELING OPERATIONS

LOW WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.2 Two independent shutdown cooling loops shall be OPERABLE and at least one shutdown cooling loop shall be in operation.

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

ACTION:

a. With less than the required shutdown cooling loops OPERABLE, within one (1) hour 1) initiate corrective action to return the required loops to OPERABLE status, or 2) establish greater than or equal to 23 feet of water above irradiated fuel assemblies seated within the reactor pressure vessel.

b. With no shutdown cooling loop in operation, suspend ~~all operations involving a reduction in boron concentration of the Reactor Coolant System~~ and within one (1) hour initiate corrective action to return the required shutdown cooling loop to operation. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours. (Insert 4)

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.8.2 At least one shutdown cooling loop shall be verified to be in operation and circulating reactor coolant at a flow rate of greater than or equal to 3000 gpm at least once per 12 hours.

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 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.

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. 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 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 operations.

3/4.1.1.5 MINIMUM TEMPERATURE FOR CRITICALITY

The MTC is expected to be slightly negative at operating conditions. However, at the beginning of the fuel cycle, the MTC may be slightly positive at operating conditions and since it will become more positive at lower temperatures, this specification is provided to restrict reactor operation when T_{avg} is significantly below the normal operating temperature.

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 pumps, and 5) 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 SHUTDOWN MARGIN from all operating conditions corresponding to the requirements of Specification 3.1.1.2 after xenon decay and cooldown to 200°F. The maximum boration capability requirement occurs at EOL from full power equilibrium xenon conditions. This requirement can be met for a range of boric acid concentrations in the Boric Acid Makeup Tanks (BAMTs) and Refueling Water Tank (RWT). This range is bounded by 5400 gallons of 3.5 weight percent (8119 ppm boron) boric acid from the BAMTs and 17,000 gallons of 1720 ppm borated water from the RWT to 8700 gallons of 2.5 weight percent (4371 ppm boron) boric acid from the BAMTs and 13,000 gallons of 1720 ppm borated water from the RWT. A minimum of 45,000 gallons of 1720 ppm boron is required from the RWT if it is to be used to borate the RCS alone.

The requirements for a minimum contained volume of 401,800 gallons of borated water in the refueling water tank ensures the capability for borating the RCS to the desired level. The specified quantity of borated water is consistent with the ECCS requirements of Specification 3.5.4. Therefore, the larger volume of borated water is specified here too.

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~~ change in the event the single injection system becomes inoperable. (Insert B 2)

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 the DNBR limit 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 loop provides sufficient heat removal capability for removing decay heat; but single failure considerations require that at least two loops (either shutdown cooling or RCS) be OPERABLE.

In MODE 5 with reactor coolant loops not filled, a single shutdown cooling loop 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 loops be OPERABLE.

The operation of one Reactor Coolant Pump or one shutdown cooling 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 B 1

The restrictions on starting a Reactor Coolant Pump 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 50. The RCS will be protected against overpressure transients and will not exceed the limits of Appendix G by restricting starting of the Reactor Coolant Pumps to when the secondary water temperature of each steam generator is less than 30°F above each of the Reactor Coolant System cold leg temperatures.

3/4.4.3 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 2×10^5 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 valves are OPERABLE, an operating shutdown cooling loop, connected to the RCS, provides overpressure relief capability and will prevent RCS overpressurization.

3/4.9 REFUELING OPERATIONS

BASES

3/4.9.1 BORON CONCENTRATION

The limitation on minimum boron concentration ensures that 1) the reactor will remain subcritical during CORE ALTERATIONS, and 2) a uniform boron concentration is maintained for reactivity control in the water volumes having direct access to the reactor vessel. The limitation on K_{eff} is sufficient to prevent reactor criticality with all full length rods (shutdown and regulating) fully withdrawn.

3/4.9.2 INSTRUMENTATION

Insert B3

The OPERABILITY of the wide range logarithmic 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 accident analyses.

3/4.9.4 CONTAINMENT 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.

In accordance with Generic Letter 91-08, Removal of Component Lists from the Technical Specifications, the opening of locked or sealed closed containment isolation valves on an intermittent basis under administrative control includes the following considerations: (1) stationing an operator, who is in constant communication with the control room, at the valve controls, (2) instructing this operator to close these valves in an accident situation, and (3) assuring that environmental conditions will not preclude access to close the valves and that this action will prevent the release of radioactivity outside the containment.

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.

3/4.9.6 MANIPULATOR CRANE OPERABILITY

The OPERABILITY requirements of the cranes used for movement of fuel assemblies ensures that: 1) each crane has sufficient load capacity to lift a fuel element, and 2) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

REFUELING OPERATIONS

BASES

3/4.9.7 CRANE TRAVEL – SPENT FUEL STORAGE BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel assembly and CEA over irradiated fuel assemblies ensures that no more than the contents of one fuel assembly will be ruptured in the event of a fuel handling accident. This assumption is consistent with the activity release assumed in the accident analyses.

3/4.9.8 SHUTDOWN COOLING AND COOLANT CIRCULATION

The requirement that at least one shutdown cooling loop 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 loops OPERABLE when there is less than 23 feet of water above the irradiated fuel in the core ensures that a single failure of the operating shutdown cooling loop will not result in a complete loss of decay heat removal capability. With the reactor vessel head removed and 23 feet of water above the irradiated fuel in the core, a large heat sink is available for core cooling, thus in the event of a failure of the operating shutdown cooling loop, adequate time is provided to initiate emergency procedures to cool the core.

3/4.9.9 CONTAINMENT ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment isolation 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.

3/4.9.10 and 3/4.9.11 WATER LEVEL – REACTOR VESSEL AND STORAGE POOL WATER LEVEL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the accident analysis.

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B 3/4 9-1
B 3/4 9-2

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.

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.

INSERT 6 – Not Used

INSERT 7

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 8

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

INSERT 9

Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specification 3.1.1.2.

INSERT 10

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 3.1.1.2.

REACTIVITY CONTROL SYSTEMS

3/4.1.2 BORATION SYSTEMS

FLOW PATHS – SHUTDOWN

LIMITING CONDITION FOR OPERATION

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 only the boric acid makeup tank in Specification 3.1.2.7a. is OPERABLE, or

b. The flow path from the refueling water tank via either a charging pump or a high pressure safety injection pump to the Reactor Coolant System if only the refueling water tank 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

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

a. 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.

b. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F by verifying that the Boric Acid Makeup Tank solution temperature is greater than 55°F (when the flow path from the Boric Acid Makeup Tank is used).

* Insert 2

REACTIVITY CONTROL SYSTEMS

CHARGING PUMPS – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.3 At least one charging pump or 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

4.1.2.3 At least the above required pumps shall be demonstrated OPERABLE by verifying the charging pump develops a flow rate of greater than or equal to 40 gpm or the high pressure safety injection pump develops a total head of greater than or equal to 2854 ft. when tested pursuant to the Inservice Testing Program.

(* Insert 2)

REACTIVITY CONTROL SYSTEMS

BORIC ACID MAKEUP PUMPS - SHUTDOWN

LIMITING CONDITION FOR OPERATION

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 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

4.1.2.5 The above required boric acid makeup pump shall be demonstrated OPERABLE by verifying, that on recirculation flow, the pump develops a discharge pressure of greater than or equal to 90 psig when tested pursuant to the Inservice Testing Program.

* 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 minimum borated water volume of 3550 gallons of 2.5 to 3.5 weight percent boric acid (4371 to 8119 ppm boron).

b. The refueling water tank with:

1. A minimum contained borated water volume of 125,000 gallons,

2. A minimum boron concentration of 1720 ppm, and

3. A solution temperature between 40°F and 120°F.

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 7 days by:

1. Verifying the boron concentration of the water,

2. Verifying the contained borated water volume of the tank, and

b. At least once per 24 hours by verifying the RWT temperature when it is the source of borated water and the outside air temperature is outside the range of 40°F and 120°F.

c. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F, by verifying that the boric acid makeup tank solution temperature is greater than 55°F when that boric acid makeup tank is required to be OPERABLE.

* Insert 2

TABLE 3.3-1 (Continued)

ACTION STATEMENTS

ACTION 2 - (Continued)

6. Cold Leg Temperature	Variable Power Level – High (RPS) Thermal Margin/Low Pressure (RPS) Local Power Density – High (RPS)
7. Hot Leg Temperature	Variable Power Level – High (RPS) Thermal Margin /Low Pressure (RPS) Local Power Density – High (RPS)

ACTION 3 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, suspend all operations involving positive reactivity changes. Verify compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 or 3.1.1.2, as applicable, within 1 hour and at least once per 12 hours thereafter.

ACTION 4 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirements, 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, provided the trip breakers of any inoperable channel are in the tripped condition, for surveillance testing per Specification 4.3.1.1.

ACTION 5 - 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.

* Insert 1

REACTOR COOLANT SYSTEM

HOT STANDBY

LIMITING CONDITION FOR OPERATION

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 2A and its associated steam generator and at least one associated Reactor Coolant pump.

b. Reactor Coolant Loop 2B 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

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 verifying the secondary side water level to be ≥ 10% indicated narrow range level at least once per 12 hours.

---

* 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

REACTOR COOLANT SYSTEM

HOT SHUTDOWN

LIMITING CONDITION FOR OPERATION

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 2A and its associated steam generator and at least one associated Reactor Coolant pump,**

b. Reactor Coolant Loop 2B and its associated steam generator and at least one associated Reactor Coolant pump,**

c. Shutdown Cooling Train 2A,

d. Shutdown Cooling Train 2B.

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 30 hours.

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 3

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* All Reactor Coolant pumps and shutdown cooling pumps may be de-energized 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

** A Reactor Coolant pump shall not be started with two idle loops and one or more of the Reactor Coolant System cold leg temperatures less than or equal to that specified in Table 3.4-3 unless the secondary water temperature of each steam generator is less than 40°F above each of the Reactor Coolant System cold leg temperatures.

REACTOR COOLANT SYSTEM

COLD SHUTDOWN – LOOPS FILLED

LIMITING CONDITION FOR OPERATION

3.4.1.4.1 At least one shutdown cooling loop shall be OPERABLE and in operation*, and either:

a. One additional shutdown cooling loop shall be OPERABLE#, or

b. The secondary side water level of at least two steam generators shall be greater than 10% indicated narrow range level.

APPLICABILITY: MODE 5 with Reactor Coolant loops filled##.

ACTION:

a. With one of the shutdown cooling loops inoperable and with less than the required steam generator level, immediately initiate corrective action to return the inoperable shutdown cooling loop to OPERABLE status or to restore the required steam generator level 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 9

SURVEILLANCE REQUIREMENTS

4.4.1.4.1.1 The secondary side water level of at least two steam generators when required shall be determined to be within limits at least once per 12 hours.

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

---

* The shutdown cooling pump may be de-energized 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 10

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.

A Reactor Coolant pump shall not be started with two idle loops unless the secondary water temperature of each steam generator is less than 40°F above each of the Reactor Coolant System cold leg temperatures.

REACTOR COOLANT SYSTEM

COLD SHUTDOWN – LOOPS NOT FILLED

LIMITING CONDITION FOR OPERATION

3.4.1.4.2 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, within 1 hour 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 within 1 hour initiate corrective action to return the required shutdown cooling loop to operation.

Insert 9

SURVEILLANCE REQUIREMENTS

4.4.1.4.2 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 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 10

PLANT SYSTEMS

3/4.7.7 CONTROL ROOM EMERGENCY AIR CLEANUP SYSTEM (CREACS)

LIMITING CONDITION FOR OPERATION

3.7.7 Two independent control room emergency air cleanup systems shall be OPERABLE with:

a. A filter train and its associated fan per system, and

b. At least one air conditioning unit per system, and

c. Two isolation valves in the kitchen area exhaust duct, and

d. Two isolation valves in the toilet area exhaust duct, and

e. Two isolation valves in each (North and South) air intake duct.

APPLICABILITY: ALL MODES.

ACTION:

MODES 1, 2, 3, and 4:

a. With one control room emergency air cleanup system inoperable, restore the inoperable system to OPERABLE status within 7 days or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With both control room emergency air cleanup systems inoperable, restore at least one system to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the next 30 hours.

c. With an isolation valve in an air intake duct or air exhaust duct inoperable, operation may continue provided the other isolation valve in the same air intake or air exhaust duct is maintained closed; otherwise, be in at least HOT STANDBY in the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

MODES 5 and 6:

a. With one control room emergency air cleanup system inoperable, restore the inoperable system to OPERABLE status within 7 days or initiate and maintain operation of the remaining OPERABLE control room emergency air cleanup system in the recirculation mode.

b. With both control room emergency air cleanup systems inoperable, suspend all operations involving CORE ALTERATIONS or positive reactivity changes *

c. With an isolation valve in an air intake duct or air exhaust duct inoperable, maintain the other isolation valve in the same air intake or air exhaust duct closed or suspend any core alterations or positive reactivity addition operations.

* Insert 1

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. Two engine-mounted fuel tanks containing a minimum volume of 200 gallons of fuel,

2. A fuel storage system containing a minimum volume of 40,000 gallons of fuel, 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, and within 8 hours, depressurize and vent the Reactor Coolant System through a greater than or equal to 3.58 square inch vent. 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 reactor vessel flange, immediately initiate corrective action to restore the required sources to OPERABLE status as soon as possible.

Insert B

SURVEILLANCE REQUIREMENTS

4.8.1.2.1 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 requirement 4.8.1.1.2a.5).

ELECTRICAL POWER SYSTEMS

D.C. SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.2 As a minimum, one 125-volt battery bank and a 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, ~~positive reactivity changes~~ or movement of irradiated fuel; initiate corrective action to restore the required battery bank to OPERABLE status as soon as possible, and within 8 hours, depressurize and vent the Reactor Coolant System through a 3.58 square inch vent.

Insert B

b. With the required full capacity charger inoperable, demonstrate the OPERABILITY of its associated battery banks 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

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

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

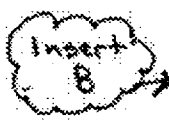
a. One train of A.C. emergency busses consisting of one 4160 volt and two 480 volt A.C. emergency busses.

b. Two 120 volt A.C. Instrument Busses energized from their associated inverters connected to their respective D.C. busses.

c. One 125 volt D.C. bus energized from 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, and within 8 hours depressurize and vent the RCS through a 3.58 square inch vent.

SURVEILLANCE REQUIREMENTS

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

3.9.2 As a minimum, two startup 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 ~~positive reactivity changes~~ Insert 4

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.

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.2 Each startup 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 loop shall be OPERABLE and in operation.*

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

ACTION:

With no shutdown cooling loop OPERABLE and in operation, suspend all operations involving an increase in reactor decay heat load or ~~a reduction in boron concentration of the Reactor Coolant System~~ and within 1 hour initiate corrective action to return the required shutdown cooling loop to OPERABLE and operating status as soon as possible. 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 once per 12 hours:

a. At least one shutdown cooling loop shall be verified to be in operation

b. The total flow rate of reactor coolant to the reactor pressure vessel shall be verified to be greater than or equal to 3000 gpm.**

---

* 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 reactor pressure vessel hot legs, provided (Insert 7)

** The reactor coolant flow rate requirement may be reduced to 1850 gpm if the following conditions are satisfied before the reduced requirement is implemented: the reactor has been determined to have been subcritical for at least 125 hours, the maximum RCS temperature is ≤ 117°F, and the temperature of CCW to the shutdown cooling heat exchanger is ≤ 87°F.

REFUELING OPERATIONS

LOW WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.2 The independent shutdown cooling loops shall be OPERABLE and at least one shutdown cooling shall be in operation.

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

ACTION:

a. With less than the required shutdown cooling loops OPERABLE, within 1 hour initiate corrective action to return the required loops to OPERABLE status, or to establish greater than or equal to 23 feet of water above the reactor pressure vessel flange, 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 within 1 hour initiate corrective action to return the required shutdown cooling loop to operation. 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 once per 12 hours:

a. At least one shutdown cooling loop shall be verified to be in operation.

b. The total flow rate of reactor coolant to the reactor pressure vessel shall be verified to be greater than or equal to 3000 gpm.*

---

* The reactor coolant flow rate requirement may be reduced to 1850 gpm if the following conditions are satisfied before the reduced requirement is implemented: the reactor has been determined to have been subcritical for at least 125 hours, the maximum RCS temperature is ≤ 117°F, and the temperature of CCW to the shutdown cooling heat exchanger is ≤ 87°F.

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 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.

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. 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 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 operations.

3/4.1.1.5 MINIMUM TEMPERATURE FOR CRITICALITY

This specification ensures that the reactor will not be made critical with the Reactor Coolant System average temperature less than 515°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, and (4) the reactor pressure vessel is above its minimum RT_{NDT} temperature.

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, and (5) 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 SHUTDOWN MARGIN from expected operating conditions of the limit specified in the COLR after xenon decay and cooldown to 200°F. The maximum expected boration capability requirement occurs at EOL from full power equilibrium xenon conditions. This requirement can be met for a range of boric acid concentrations in the Boric Acid Makeup Tank (BAMT) and Refueling Water Tank (RWT). This range is bounded by 5350 gallons of 3.5 weight percent (6119 ppm boron) from the BAMT and 16,000 gallons of 1720 ppm borated water from the RWT to 8660 gallons of 2.5 weight percent (4371 ppm boron) boric acid from BAMT and 12,000 gallons of 1720 ppm borated water from the RWT. A minimum of 35,000 gallons of 1720 ppm boron is required from the RWT if it is to be used to borate the RCS alone.

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 B 2.)

The boron capability required below 200°F is based upon providing a SHUTDOWN MARGIN corresponding to its COLR limit after xenon decay and cooldown from 200°F to 140°F. This condition requires either 6750 gallons of 1720 ppm – 2100 ppm borated water from the refueling water tank or 3550 gallons of 2.5 to 3.5 weight percent boric acid solution from the boric acid makeup tanks.

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 loop provides sufficient heat removal capability for removing decay heat; but single failure considerations require that at least two loops (either shutdown cooling or RCS) be OPERABLE.

In MODE 5 with reactor coolant loops not filled, a single shutdown cooling loop 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 loops be OPERABLE.

The operation of one reactor coolant pump or one shutdown cooling 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 B4

The restriction on starting a reactor coolant pump in MODES 4 and 5, with two idle loops and one or more RCS cold leg temperatures less than or equal to that specified in Table 3.4-3 is provided to prevent RCS pressure transients, caused by energy additions from the secondary system from exceeding the limits of Appendix G to 10 CFR 50. The RCS will be protected against overpressure transients by (1) sizing each PORV to mitigate the pressure transient of an inadvertent safety injection actuation in a water-solid RCS with pressurizer heaters energized, (2) restricting starting of the RCPs to when the secondary water temperature of each steam generator is less than 40°F above each of the RCS cold leg temperatures, (3) using SDCRVs to mitigate RCP start transients and the transients caused by inadvertent SIAS actuation and charging water, and (4) rendering one HPSI pump inoperable when the RCS is at low 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 212,182 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 valves are OPERABLE, an operating shutdown cooling loop, connected to the RCS, provides overpressure relief capability and will prevent RCS overpressurization. In addition, the Overpressure Protection System provides a diverse means of protection against RCS overpressurization at low temperatures.

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 volumes having direct access to the reactor vessel. Those limitations are consistent with the initial conditions assumed for the boron dilution incident in the safety analyses. The value specified in the COLR for K_{eff} includes a 1% delta k/k conservative allowance for uncertainties. Similarly, the boron concentration value specified in the COLR includes a conservative uncertainty allowance of 50 ppm boron.

Insert B 3

3/4.9.2 INSTRUMENTATION

The OPERABILITY of the startup 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.

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 MANIPULATOR CRANE

The OPERABILITY requirements for the refueling machine ensures that: (1) manipulator cranes will be used for movement of fuel assemblies, with or without CEAs, (2) each crane has sufficient load capacity to lift a fuel assembly, with or without CEAs, 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 – SPENT FUEL STORAGE POOL BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel assembly, CEA and associated handling tool over other fuel assemblies in the storage pool 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 loop 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 loops OPERABLE when there is less than 23 feet of water above the reactor pressure vessel flange with irradiated fuel in the core ensures that a single failure of the operating shutdown cooling loop will not result in a complete loss of decay heat removal capability. With the reactor vessel head removed and 23 feet of water above the reactor pressure vessel flange with irradiated fuel in the core, a large heat sink is available for core cooling. Thus in the event of a failure of the operating shutdown cooling loop, adequate time is provided to initiate emergency procedures to cool the core.

The footnote providing for a minimum reactor coolant flow rate of $\geq$ 1850 gpm considers one of the two RCS injection points for a SDCS train to be isolated. The specified parameters include 50 gpm for flow measurement uncertainty, and 3°F uncertainty for RCS and CCW temperature measurements. The conditions of minimum shutdown time, maximum RCS temperature, and maximum temperature of CCW to the shutdown cooling heat exchanger are initial conditions specified to assure that a reduction in flow rate from 3000 gpm to 1800 gpm will not result in a temperature transient exceeding 140°F during conditions when the RCS water level is at an elevation $\geq$ 29.5 feet.

3/4.9.9 CONTAINMENT ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment isolation 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.