Pacific Gas and Electric Company

Gregory M. Rueger
Senior Vice President–
Generation and
Chief Nuclear Officer

US Mail:
Mail Code B32
Pacific Gas and Electric Company
PO Box 770000
San Francisco, CA 94177-0001

Overnight Mail:
Mail Code B32
Pacific Gas and Electric Company
77 Beale Street, 32nd Floor
San Francisco, CA 94105-1814

415.973.4684
Fax: 415.973.2313

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PG&E Letter DCL-02-038

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
License Amendment Request 02-02, Revision to Technical Specifications Regarding Suspension of Positive Reactivity Additions

Dear Commissioners and Staff:

In accordance with 10 CFR 50.90, enclosed is an application for amendment to Facility Operating License Nos. DPR-80 and DPR-82 for Units 1 and 2 of the Diablo Canyon Power Plant (DCPP), respectively. This license amendment request (LAR) proposes to revise several of the Required Actions in the DCPP Technical Specifications (TS) that require suspension of operations involving positive reactivity additions or suspension of operations involving reactor coolant system (RCS) boron concentration reductions. In addition, this LAR proposes to revise several Limiting Condition for Operation (LCO) Notes that preclude reductions in RCS boron concentration when a reactor coolant pump(s) and/or a residual heat removal pump(s) are removed from operation. The proposed changes would allow small, controlled, safe insertions of positive reactivity, but limit the introduction of positive reactivity to ensure that compliance with the required shutdown margin or refueling boron concentration limits will still be satisfied. This LAR is based on NRC-approved traveler TSTF-286, Revision 2.

PG&E is submitting this LAR in conjunction with an industry consortium of six plants as a result of a mutual agreement known as Strategic Teaming and Resource Sharing (STARS). The STARS group consists of the six plants operated by TXU Generation Company LP, Union Electric Company, Wolf Creek Nuclear Operating Corporation, Pacific Gas and Electric Company, STP Nuclear Operating Company, and Arizona Public Service Company. The other members of the group are expected to submit license amendment requests similar to this one, with the exception of STP Nuclear Operating Company which has already received NRC approval of a license amendment based on TSTF-286, Revision 2. Enclosures 1 through 4 provide the evaluation, markup of TS, retyped TS, and proposed TS Bases changes, in support of this amendment.

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request. Enclosure 4 is provided for information only. Final Bases changes will be implemented pursuant to TS 5.5.14, "Technical Specifications (TS) Bases Control Program." Appendix A demonstrates the extent to which TSTF-286 Revision 2 was followed, similar to the Appendix attached to the NRC safety evaluation for H. B. Robinson Unit 2 License Amendment 190.

It has been determined that this amendment application does not involve a significant hazard consideration as determined per 10CFR50.92. Pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of this amendment.

The changes in this LAR are not required to address an immediate safety concern. PG&E requests approval of this LAR by March 2003, and that the LAR be made effective upon NRC issuance, to be implemented within 30 days from the date of issuance.

Sincerely,

Gregory M. Rueger
Senior Vice President –
Generation and Chief Nuclear Officer

tcg
Enclosures
cc/enc: Edgar Bailey, DHS
Ellis W. Merschoff
David L. Proulx
Girija S. Shukla
Diablo Distribution

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of PACIFIC GAS AND ELECTRIC COMPANY	)	Docket No. 50-275 Facility Operating License No. DPR-80
Diablo Canyon Power Plant Units 1 and 2	)	Docket No. 50-323 Facility Operating License No. DPR-82

AFFIDAVIT

Gregory M. Rueger, of lawful age, first being duly sworn upon oath says that he is Senior Vice President - Generation and Chief Nuclear Officer of Pacific Gas and Electric Company; that he has executed license amendment request LAR 02-02 on behalf of said company with full power and authority to do so; that he is familiar with the content thereof; and that the facts stated therein are true and correct to the best of his knowledge, information, and belief.

Gregory M. Rueger
Senior Vice President - Generation and Chief Nuclear Officer

Subscribed and sworn to before me this 10th day of April 2002.

Notary Public
County of San Francisco
State of California

AMY EMIKO DONG
Commission # 1206749
Notary Public - California
San Francisco County
My Comm. Expires Jan 2, 2003

LICENSE AMENDMENT REQUEST 02-02, REVISION TO TECHNICAL SPECIFICATIONS REGARDING SUSPENSION OF POSITIVE REACTIVITY ADDITIONS

1.0 INTRODUCTION

This license amendment request (LAR) revises several of the Required Actions in the Diablo Canyon Power Plant (DCPP) Technical Specifications (TS) that require suspension of operations involving positive reactivity additions or suspension of operations involving reactor coolant system (RCS) boron concentration reductions. In addition, this LAR revises several limiting condition for operation (LCO) Notes that preclude reductions in RCS boron concentration. This LAR revises these Required Actions and LCO Notes to allow small, controlled, safe insertions of positive reactivity, but limits the introduction of positive reactivity to assure compliance with the required shutdown margin (SDM) or refueling boron concentration limits.

2.0 DESCRIPTION OF PROPOSED AMENDMENT

The proposed changes modify the Required Actions and LCO Notes that direct the suspension of activities that involve positive reactivity changes or RCS boron concentration reductions, with the exception of Required Action A.2 of TS 3.9.1 (TS Bases changes are attached for that Action). Clarifications are provided in the proposed TS Bases changes identifying which plant evolutions are acceptable when operating under a Condition or LCO Note requiring suspension of positive reactivity additions or RCS boron concentration reductions.

The proposed changes will allow limited insertions of positive reactivity that are associated with routine plant operations. The proposed changes also will limit the amount of positive reactivity additions that are allowed consistent with assuring compliance with the appropriate SDM or refueling boron concentration limits.

The proposed TS changes are consistent with License Amendment 190 for H. B. Robinson Unit 2 (Reference 2) and with approved Industry/Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-286, Revision 2, "Define 'Operations Involving Positive Reactivity Additions'," (Reference 3), with exceptions noted in the applicable descriptions of changes below or summarized in Appendix A. References are listed in Section 10.0 of this LAR.

The proposed TS changes are as follows:

1. Add a Note to TS 3.3.1, "RTS Instrumentation," Required Action G.1, that states: "Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed."

   Condition G is applicable when the two required Intermediate range neutron flux channels are inoperable. Required Action G.1 currently states: "Suspend operations involving positive reactivity additions." The proposed Note will allow limited plant temperature changes or boron concentration fluctuations associated with RCS temperature control or inventory management.

   Required Action G.1 will continue to require suspension of operations involving positive reactivity additions, while allowing the small reactivity variations that result from the temperature or boron concentration fluctuations associated with normal RCS temperature control or inventory management. Therefore, this proposed change simply clarifies the Required Action.

   The proposed change to TS 3.3.1 Required Action G.1 differs from TSTF-286, Revision 2 (Reference 3). TSTF-286, Revision 2, Insert 1 adds a Note stating: "Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM." The proposed change does not include "...provided the change is accounted for in the calculated SDM." In Modes 1 and 2 with $k_{eff} \geq 1.0$, SDM is not a "calculated" value. Rather, SDM is assured by operation within the rod insertion limits of LCO 3.1.5, "Shutdown Bank Insertion Limits," and LCO 3.1.6 "Control Bank Insertion Limits" and by operating the plant per the requirements of LCO 3.4.2, "RCS Minimum Temperature for Criticality." This clarification is also described in the proposed Bases discussion of the new Note. The use of the words "temperature changes" in lieu of "cooldown" is considered more accurate since the DCPP TS allow positive Moderator Temperature Coefficient (MTC) values at reduced power levels. Under positive MTC conditions a temperature increase would cause a positive reactivity addition. The wording "temperature changes" refers to the fact that the MTC must be considered both during cooldown and heatup operations. The use of the words "Limited boron concentration changes associated with RCS inventory control" in lieu of "boron dilution" is consistent with the intent of TSTF-286, Revision 2, as expressed in Insert B1 of the traveler, and provides further clarification of the Note. This wording is more descriptive of

DCPP operations than "boron dilution." This wording is more accurate with regard to the existing plant design which features two independent reactivity control systems: one using the movable control and shutdown rod cluster control assemblies (RCCAs), and the other using the chemical volume and control system (CVCS).

This wording is identical to that approved for H. B. Robinson Unit 2 (Reference 2).

2. Add a Note to TS 3.3.1, "RTS Instrumentation," Required Action I.1, that states: "Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed."

   Condition I is applicable when one of the two required Source Range Neutron Flux channels is inoperable in MODE 2 below P-6. Required Action I.1 currently states: "Suspend operations involving positive reactivity additions." The proposed Note will allow limited plant temperature changes or boron concentration fluctuations associated with RCS temperature control or inventory management.

   Required Action I.1 will continue to require suspension of operations involving positive reactivity additions, while allowing the small reactivity variations that result from the temperature or boron concentration fluctuations associated with normal RCS temperature control or inventory management. Therefore, this proposed change simply clarifies the Required Action. The proposed change to TS 3.3.1 Required Action I.1 differs from TSTF-286, Revision 2, in the same fashion, and for the same reasons, as described above for Required Action G.1 of TS 3.3.1.

   This wording is identical to that approved for H. B. Robinson Unit 2 (Reference 2).

3. Add a Note to TS 3.3.1, "RTS Instrumentation," Required Action L.1 that states: "Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SDM."

   Condition L is applicable when the required Source Range Neutron Flux channel is inoperable with the reactor trip breakers open or all rods fully inserted and incapable of withdrawal. In this condition, the source range function does not provide reactor trip but does provide indication. Required Action L.1 currently states: "Suspend operations involving positive reactivity additions." The proposed

Note will allow plant temperature changes provided the temperature change is accounted for in the calculated SDM.

Required Action L.1 will continue to require suspension of operations involving positive reactivity additions, while allowing the small reactivity variations that result from the temperature fluctuations associated with normal RCS temperature control. Therefore, this proposed change simply clarifies the Required Action. The proposed change to TS 3.3.1 Required Action L.1 is identical to Insert 2 of TSTF-286, Revision 2.

4. Revise TS 3.4.5, "RCS Loops - MODE 3," LCO Note a, TS 3.4.6, "RCS Loops - MODE 4," LCO Note 1.a, TS 3.4.7, "RCS Loops - MODE 5, Loops Filled," LCO Note 1.a, and TS 3.4.8, "RCS Loops - MODE 5, Loops Not Filled," LCO Note 1.b, to state: "No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and."

   These Notes currently state: "No operations are permitted that would cause reduction of the RCS boron concentration," or "No operations are permitted that would cause a reduction of the RCS boron concentration," and are intended to preclude dilution of the RCS when no forced mixing (i.e., coolant circulation by RHR pumps or reactor coolant pumps) is taking place. The proposed changes allow dilution of the RCS, but the source of inventory makeup is required to contain a soluble boron concentration greater than that required to meet the SDM requirement of LCO 3.1.1. These proposed changes are identical to Insert 5 of TSTF-286, Revision 2.

5. Revise TS 3.4.5 Required Action D.2, TS 3.4.6 Required Action B.1, TS 3.4.7 Required Action B.1, and TS 3.4.8 Required Action B.1 to state: "Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1."

   These Required Actions currently state: "Suspend all operations involving a reduction of RCS boron concentration," or "Suspend all operations involving reduction in RCS boron concentration," and are intended to preclude dilution of the RCS when no forced mixing is taking place. The proposed changes allow dilution of the RCS, but the source of inventory makeup is required to contain a soluble boron concentration greater than that required to meet the SDM

requirement of LCO 3.1.1. These proposed changes are identical to Insert 3 of TSTF-286, Revision 2.

6. Revise TS 3.8.2, "AC Sources - Shutdown," Required Actions A.2.3 and B.3, TS 3.8.5, "DC Sources - Shutdown," Required Action A.2.3, TS 3.8.8, "Inverters - Shutdown," Required Action A.2.3, and TS 3.8.10, "Distribution Systems - Shutdown," Required Action A.2.3 to state: "Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration."

   These Required Actions currently state: "Initiate action to suspend operations involving positive reactivity additions," and are intended to initiate suspension of operations involving positive reactivity additions based on the loss of required electrical sources and distribution equipment. The proposed changes allow dilution of the RCS, but the source of inventory makeup is required to contain a soluble boron concentration greater than that required to meet the SDM requirement of LCO 3.1.1 or the refueling boron concentration of LCO 3.9.1. The proposed changes will also allow temperature changes that could add positive reactivity provided the reactivity insertions do not result in a loss of required SDM or required refueling boron concentration. These proposed changes are identical to Insert 8 of TSTF-286, Revision 2.

7. Revise TS 3.9.3, "Nuclear Instrumentation," Required Action A.2, to state: "Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of LCO 3.9.1."

   This Required Action currently states: "Suspend positive reactivity additions except for latching control rod drive shafts and friction testing of individual control rods," and is intended to initiate suspension of operations involving positive reactivity additions when there is a loss of one required Source Range Neutron Flux monitor, thereby rendering inoperable the redundant channel for monitoring core reactivity. The proposed change allows dilution of the RCS, but the source of inventory makeup is required to contain a soluble boron concentration greater than that required to meet the minimum refueling boron concentration requirement of LCO 3.9.1. This proposed change also removes the implicit limitation on temperature changes that could result in a positive reactivity addition. No limitation on temperature change-induced reactivity insertion is needed, because the appropriate shutdown margin in

Mode 6 is maintained by compliance with LCO 3.9.1. This proposed change is identical to Insert 4 of TSTF-286, Revision 2.

The exception for latching control rod drive shafts and friction testing of individual control rods is no longer required in Required Action A.2 because of the proposed change.

8. Revise the first LCO Note for TS 3.9.5, "RHR and Coolant Circulation - High Water Level," to state: "The required RHR loop may be removed from operation for ≤ 1 hour per 8 hour period, provided no operations are permitted that would cause introduction into the Reactor Coolant System (RCS), coolant with boron concentration less than that required to meet the minimum required boron concentration of LCO 3.9.1."

   This LCO Note currently states: "The required RHR loop may be removed from operation for ≤ 1 hour per 8 hour period, provided no operations are permitted that would cause reduction of the Reactor Coolant System boron concentration," and is intended to preclude dilution of the RCS when no forced mixing is taking place. The proposed change allows dilution of the RCS, but the source of inventory makeup is required to contain a soluble boron concentration greater than that required to meet the minimum refueling boron concentration requirement of LCO 3.9.1. This proposed change is identical to the markups and Insert 7 of TSTF-286, Revision 2.

9. Revise TS 3.9.5, "RHR and Coolant Circulation - High Water Level," Required Action A.1, and TS 3.9.6, "RHR and Coolant Circulation - Low Water Level," Required Action B.1, to state: "Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of LCO 3.9.1."

   These Required Actions currently state: "Suspend operations involving a reduction in reactor coolant boron concentration," and are intended to preclude dilution of the RCS when no forced mixing is taking place. The proposed changes allow dilution of the RCS, but the source of the inventory makeup is required to contain a soluble boron concentration greater than that required to meet the minimum refueling boron concentration requirement of LCO 3.9.1. These proposed changes are identical to Insert 4 of TSTF-286, Revision 2.

The associated TS Bases will be revised accordingly; see the proposed changes in Enclosure 4. The following two additional TS Bases changes were taken directly from TSTF-286, Revision 2:

1. The Bases for TS 3.9.1, "Boron Concentration," Required Action A.2 will be revised to add the following: "Operations that individually add limited positive reactivity (e.g., temperature fluctuations, 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."

2. An editorial change is made to the Bases for TS 3.9.1 Required Action A.3. The discussion regarding immediately suspending CORE ALTERATIONS or positive reactivity additions is corrected. The word "or" between "CORE ALTERATIONS" and "positive reactivity additions" should be "and" consistent with the requirements of the TS 3.9.1 Required Actions.

Finally, the Bases for TS 3.9.3, "Nuclear Instrumentation," Required Action B.2 will be revised for consistency with the changes made to TS 3.9.3 Required Action A.2. This change was not included in TSTF-286, Revision 2, but is needed since the revised Action A.2 would no longer absolutely preclude positive reactivity additions. This was an oversight in TSTF-286. The list of affected TS in TSTF-286 included "Action 3.9.3.B Bases, Nuclear Instrumentation, NUREG-1431 Only"; however, there were no changes to the Action 3.9.3.B Bases marked on page B 3.9-9 of the traveler.

Enclosures 2 and 4 provide the TS markups and proposed TS Bases changes, respectively.

3.0 BACKGROUND

DCPP implemented the Improved Technical Specifications in July 2000 under License Amendment 135 (Reference 1). Since then the industry and the NRC staff have been working to improve the Standard Technical Specifications (STS) NUREGs and, as a result, generic changes have been incorporated into Revision 2 of the STS NUREGs. This proposed amendment adopts generic changes from TSTF-286, Revision 2, which was incorporated into the STS by the NRC staff on July 6, 2000.

DCPP has two independent reactivity control systems. One uses the movable control and shutdown RCCAs, and the other uses the CVCS to adjust the soluble boron concentration. In Modes 1 and 2, both systems

are used to compensate for the reactivity effects from the fuel and coolant temperature changes in the RCS during power operation from full load to no load conditions. In Modes 3, 4, and 5, the CVCS is used to compensate for the reactivity effects from temperature and xenon changes. In Mode 6, the CVCS is used to maintain the refueling boron concentration within the required limits.

The DCPP SDM limits provide sufficient reactivity margin to ensure that the specified acceptable fuel design limits will not be exceeded for normal shutdown and anticipated operational occurrences (AOOs). The SDM definition assumes that the single RCCA with the highest reactivity worth remains fully withdrawn. In Modes 1 and 2 with $k_{eff} \geq 1.0$, the TS satisfy the required SDM (which is the amount of subcriticality that would immediately occur following the insertion of control and shutdown RCCAs that had been withdrawn, assuming the fuel and moderator temperatures are at hot zero power values) by limiting the insertion of the control and shutdown banks. Small reactivity changes due to RCS coolant inventory management and temperature control are also considered in determining SDM, including MTC effects. In Modes 2 with $k_{eff} < 1.0$, 3, 4, and 5, the TS specify the required SDM (which is the reactivity margin by which the reactor will remain subcritical with the RCCAs fully inserted) by reference to the Core Operating Limits Report.

In Mode 6, reactor subcriticality margin is ensured by the limit on the boron concentration of all filled portions of the RCS and the spent fuel pool that have direct access to the reactor vessel.

The TS will be modified by this LAR to permit the addition of positive reactivity and changes to the RCS boron concentration as long as the change preserves the margin to core criticality as defined by the SDM and refueling boron concentration limit specifications.

NEED FOR CHANGE

The proposed changes are needed to address operational considerations. During Conditions in which these Required Actions are entered, various plant operations must be continued. These activities may make it necessary to add cooler water to the RCS (a positive reactivity change in most cases) or warmer water to the RCS and may involve inventory makeup from sources that are at a boron concentration less than that in the RCS.

Operational considerations may make it necessary or prudent to use a different residual heat removal (RHR) loop from the one in operation. With the proposed changes, if the newly selected RHR loop is sampled and the

boron concentration is slightly lower than that of the RCS, but sufficiently high that SDM and refueling boron concentration limits continue to be met, the switch to a different loop would be acceptable. Alternatively, if the RHR loop is at a different temperature than the RCS average temperature, but the reactivity effects are small enough to assure that SDM and refueling boron concentration limits will continue to be met, the swap-over to the alternate RHR loop should be allowed.

These types of activities should not be precluded as long as the required SDM or refueling boron concentration is maintained. The proposed changes provide the flexibility necessary to provide for continued, safe reactor operations while also limiting any potential for excess positive reactivity additions.

4.0 REGULATORY REQUIREMENTS AND GUIDANCE

The regulatory requirements associated with reactivity control include the following:

Criterion 10 -- Reactor design. The reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.

Criterion 11 -- Reactor inherent protection. The reactor core and associated coolant systems shall be designed so that in the power operating range the net effect of the prompt inherent nuclear feedback characteristics tends to compensate for a rapid increase in reactivity.

Criterion 12 -- Suppression of reactor power oscillations. The reactor core and associated coolant, control, and protection systems shall be designed to assure that power oscillations which can result in conditions exceeding specified acceptable fuel design limits are not possible or can be reliably and readily detected and suppressed.

Criterion 25 -- Protection system requirements for reactivity control malfunctions. The protection system shall be designed to assure that specified acceptable fuel design limits are not exceeded for any single malfunction of the reactivity control systems, such as accidental withdrawal (not ejection or dropout) of control rods.

Criterion 26 -- Reactivity control system redundancy and capability. Two independent reactivity control systems of different design principles shall be provided. One of the systems shall use control rods, preferably

including a positive means for inserting the rods, and shall be capable of reliably controlling reactivity changes to assure that under conditions of normal operation, including anticipated operational occurrences, and with appropriate margin for malfunctions such as stuck rods, specified acceptable fuel design limits are not exceeded. The second reactivity control system shall be capable of reliably controlling the rate of reactivity changes resulting from planned, normal power changes (including xenon burnout) to assure acceptable fuel design limits are not exceeded. One of the systems shall be capable of holding the reactor core subcritical under cold conditions.

Criterion 27 -- Combined reactivity control systems capability. The reactivity control systems shall be designed to have a combined capability, in conjunction with poison addition by the emergency core cooling system, of reliably controlling reactivity changes to assure that under postulated accident conditions and with appropriate margin for stuck rods the capability to cool the core is maintained.

Criterion 28 -- Reactivity limits. The reactivity control systems shall be designed with appropriate limits on the potential amount and rate of reactivity increase to assure that the effects of postulated reactivity accidents can neither (1) result in damage to the reactor coolant pressure boundary greater than limited local yielding nor (2) sufficiently disturb the core, its support structures or other reactor pressure vessel internals to impair significantly the capability to cool the core. These postulated reactivity accidents shall include consideration of rod ejection (unless prevented by positive means), rod dropout, steam line rupture, changes in reactor coolant temperature and pressure, and cold water addition.

Criterion 29 -- Protection against anticipated operational occurrences. The protection and reactivity control systems shall be designed to assure an extremely high probability of accomplishing their safety functions in the event of anticipated operational occurrences.

5.0 TECHNICAL ANALYSIS

Design Basis and Safety Analysis Considerations

The changes in TSTF-286, Revision 2, revise the following: 1) Required Actions that require suspension of operations involving positive reactivity additions or suspension of RCS boron concentration reductions and 2) various LCO Notes precluding reduction in boron concentration. The revised TS limit the introduction of positive reactivity into the RCS to that which would maintain the TS required SDM or refueling boron concentrations, as applicable. Additionally, the TS Required Actions that

will still require the suspension of positive reactivity changes have Bases additions that clarify the intent is to preclude a loss of SDM.

The TS Required Actions and LCO Notes that preclude positive reactivity additions and reductions in boron concentration are intended to maintain the required SDM or refueling boron concentration. During Conditions in which these Required Actions are invoked, various plant operations (e.g., maintaining RCS inventory and controlling RCS temperature) must be continued. These necessary activities may involve additions to the RCS of different temperature makeup and may involve makeup from borated sources of water that are at boron concentrations less than the RCS boron concentration. These activities should not be precluded if the overall effect would still assure the required SDM or refueling boron concentration is maintained.

Small changes in reactivity occur as a result of temperature changes that accompany RCS inventory management or RCS temperature control. At the beginning of core life below 70% rated thermal power, positive MTC must also be considered.

The RCS boron concentration is maintained greater than or equal to the concentration required to maintain the required SDM in Modes 3, 4, and 5 or to maintain the required minimum refueling boron concentration in Mode 6. The TS Required Actions and LCO Notes that preclude decreasing the RCS boron concentration in the event that the plant has entered the revised TS Conditions are unduly restrictive if the overall effect on the core would still assure that the required LCO 3.1.1 SDM or LCO 3.9.1 boron concentration is maintained. The proposed change would allow using borated water sources that may decrease the RCS boron concentration while assuring the LCO 3.1.1 SDM or LCO 3.9.1 boron concentration limits are maintained.

The TS required SDM at DCPP is determined during the reload core design and is ensured during plant operation by the positioning of the RCCA control and shutdown rod banks and through adjustments of the soluble boron concentration in the reactor coolant.

The minimum required SDM is assumed as an initial condition in the safety analyses to ensure that the specified acceptable fuel design limits will not be exceeded for normal shutdown and anticipated operational occurrences (AOOs), assuming that the highest worth RCCA remains stuck out following a reactor scram. The main steamline break is the most limiting event to establish the minimum SDM value for LCO 3.1.1, and this ensures that the departure from nucleate boiling ratio safety limit is not exceeded.

In Modes 3, 4, and 5, the reactivity of the core must be consistent with the initial conditions assumed for the boron dilution accident analysis to ensure the minimum time required to terminate the event is met. This is satisfied by complying with the requirements of LCO 3.1.1 for the minimum SDM. Additionally, for Mode 6, the required boron concentration of LCO 3.9.1 ensures subcriticality during refueling operations.

As described in the SDM LCO 3.1.1 Bases, a sufficient shutdown margin ensures that: (1) the reactor can be made subcritical from all operating conditions, transients, and Design Basis Events; (2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits; and (3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition. The Bases for the LCO 3.9.1 refueling boron concentration similarly indicate that the limitations on reactivity conditions during refueling ensure that the reactor will remain subcritical during Mode 6. Since the proposed changes will not alter the limits established in these specifications, there will be no effect on the ability to shutdown and maintain the reactor in a subcritical condition.

During certain conditions that are addressed in this proposed change, addition of water with a reduced boron concentration compared to the RCS and temperature changes will be allowed when forced circulation is not occurring. The proposed changes only permit the addition of inventory from sources whose boron concentration is sufficient to maintain the required boron concentration if the entire RCS inventory was replaced from the selected source. That is, the source of the water being added must have a high enough boron concentration that the effects of stratification, and subsequent mixing upon restoration of forced flow, cannot result in failure to meet the required boron concentration limits. This limitation addresses potential concerns with stratification and subsequent introduction of the "reduced" concentration borated water into the reactor vessel when forced circulation is re-established.

Based on the evaluation above, it is appropriate to make the proposed changes to the affected specifications. The proposed changes will not affect the limits on reactivity control (required SDM or refueling boron concentration limits), and will not permit operations that could result in exceeding these limits. Therefore, the proposed change will not affect any safety margin or safety limit applicable to the facility.

Summary/Conclusion

The proposed amendment revises several of the Required Actions in the DCPP Technical Specifications that require suspension of operations involving positive reactivity additions or suspension of operations involving RCS boron concentration reductions. In addition, the proposed amendment revises several LCO Notes that preclude reductions in RCS boron concentration. This amendment revises these Required Actions and LCO Notes to allow small, controlled, safe insertions of positive reactivity, but limits the introduction of positive reactivity such that compliance with the required SDM or refueling boron concentration limits will still be satisfied. The analyses presented above assess the potential impact of the proposed changes on applicable safety analyses. The assessments demonstrate that the change will not adversely affect the design basis, safety analyses, or the safe operation of the plant.

6.0 REGULATORY ANALYSIS

There have been no changes to the plant design such that any of the regulatory requirements in Section 4.0 would come into question. This amendment application revises Required Actions and LCO Notes dealing with the suspension of positive reactivity additions or RCS boron concentration reductions. The evaluation performed by PG&E in Section 5.0 concludes that DCPP will continue to comply with all applicable regulatory requirements.

Based on the considerations discussed above, (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) issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

7.0 NO SIGNIFICANT HAZARDS DETERMINATION

This license amendment request (LAR) revises several of the Required Actions in the Diablo Canyon Power Plant (DCPP) Technical Specifications (TS) that require suspension of operations involving positive reactivity additions or suspension of operations involving reactor coolant system (RCS) boron concentration reductions. In addition, the proposed amendment revises several limiting condition for operation (LCO) Notes that preclude reductions in RCS boron concentration. This amendment revises these Required Actions and LCO Notes to allow small, controlled, safe insertions of positive reactivity, but limits the introduction of positive

reactivity such that compliance with the required shutdown margin (SDM) or refueling boron concentration limits will still be satisfied.

The proposed amendment does not involve a significant hazards consideration for DCPP based on the three standards set forth in 10CFR50.92(c) as discussed below:

(1) Do the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

Overall protection system performance will remain within the bounds of the previously performed accident analyses since there are no hardware changes. The reactor trip system instrumentation and reactivity control systems will be unaffected. Protection systems will continue to function in a manner consistent with the plant design basis. All design, material, and construction standards that were applicable prior to the request are maintained.

The probability and consequences of accidents previously evaluated in the Final Safety Analysis Report Update (FSAR) are not adversely affected because the changes to the Required Actions and LCO Notes assure the limits on SDM and refueling boron concentration continue to be met, consistent with the analysis assumptions and initial conditions included within the safety analysis and licensing basis. The activities covered by this LAR are routine operating evolutions. The proposed changes do not reduce the capability to borate the RCS.

The equipment and processes used to implement RCS boration or dilution evolutions are unchanged and the equipment and processes are commonly used throughout the applicable modes under consideration. There will be no degradation in the performance of or an increase in the number of challenges imposed on, safety-related equipment assumed to function during an accident. There will be no change to normal plant operating parameters or accident mitigation performance.

The proposed changes will not alter any assumptions or change any mitigation actions in the radiological consequence evaluations in the FSAR.

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

(2) Do the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

There are no hardware changes or any changes in the method by which any safety-related plant system performs its safety function. This amendment will not affect the normal method of plant operation or change any operating limits. The proposed changes permit the conduct of normal operating evolutions when additional controls over core reactivity are imposed by the TS. The proposed changes do not introduce any new equipment into the plant or alter the manner in which existing equipment will be operated. The changes to operating procedures are minor, with clarifications provided that required limits must continue to be met. No performance requirements or response time limits will be affected. These changes are consistent with assumptions made in the safety analysis and licensing basis regarding limits on SDM and refueling boron concentration.

No new accident scenarios, transient precursors, failure mechanisms, or limiting single failures are introduced as a result of this LAR. There will be no adverse effect or challenges imposed on any safety-related system as a result of this LAR.

This LAR does not alter the design or performance of the reactor protection system, nuclear instrumentation system, or solid state protection system used in the plant protection systems.

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

(3) Do the proposed changes involve a significant reduction in a margin of safety?

Response: No

The proposed changes do not alter the limits on SDM or refueling boron concentration. These limits continue to assure that core parameters remain within the bounds of the accident analysis. The nominal trip setpoints specified in the TS and the safety analysis limits assumed in the transient and accident analyses are unchanged. None of the acceptance criteria for any accident analysis is changed.

The proposed changes do not affect the manner in which safety limits or limiting safety system settings are determined, nor will there be any effect on those plant systems necessary to assure the accomplishment of protection functions. Also, the proposed changes do not impact the overpower limit, departure from nucleate boiling ratio limits, heat flux hot channel factor (F_Q), nuclear enthalpy rise hot channel factor ($F\Delta H$), loss of coolant accident peak cladding temperature, peak local power density, or any other margin of safety. The radiological dose consequence acceptance criteria will continue to be met.

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

Conclusion:

Based on the above, PG&E 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.

8.0 ENVIRONMENTAL CONSIDERATION

PG&E has determined that the proposed amendment would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. PG&E has evaluated the proposed change and has determined that the change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amount of effluent that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22 (c)(9). Therefore, pursuant to 10 CFR 51.22 (b), an environmental assessment of the proposed change is not required.

9.0 PRECEDENTS

The Technical Specification changes requested in this amendment application are identical to those previously approved for H. B. Robinson Steam Electric Plant Unit 2 and are based on changes approved in TSTF-286, Revision 2. See Appendix A for additional discussion.

10.0 REFERENCES

1. NRC letter dated May 28, 1999, "Conversion to Improved Technical Specifications for Diablo Canyon Power Plant, Units 1 and 2 – Amendments 135 to Facility License Nos. DPR-80 and DPR-82 (TAC Nos. M98984 and M98985)."

2. H. B. Robinson Steam Electric Plant Unit 2 License Amendment 190 dated March 14, 2001.

3. Industry/TSTF Standard Technical Specification Change Traveler TSTF-286, Revision 2, "Define 'Operations Involving Positive Reactivity Additions'."

APPENDIX A

A Correlation of Proposed Changes to Approved TSTF-286, Revision 2, STS Changes

The following TSTF-286 changes are applicable to Diablo Canyon Power Plant (DCPP), but required some additional justification or clarification before incorporation, as discussed in Section 2.0 of Enclosure 1, "Description of Proposed Amendment." Note that Technical Specification (TS) Bases changes are included in this list for information only, since they were included in a similar list attached to the NRC Safety Evaluation Report for Reference 2 of Enclosure 1. As stated in the cover letter, TS Bases changes are provided for information only since they are under licensee control. The discussion below provides a correlation between the manner in which DCPP intends to revise the TS Bases vs. the TS Bases changes included in the approved traveler.

These deviations from TSTF-286, Revision 2, are identical to those previously approved for H. B. Robinson, Unit 2, with the exception of changes to the Action G.1 and I.1 Bases to refer to the Core Operating Limits Report since that document specifies the shutdown margin.

- 3.3.1 Action G.1 — RTS Instrumentation
- 3.3.1 Action G.1 Bases — RTS Instrumentation
- 3.3.1 Action I.1 — RTS Instrumentation
- 3.3.1 Action I.1 Bases — RTS Instrumentation

The following TSTF-286 TS changes are applicable to DCPP and are therefore incorporated identically as written in the traveler:

- 3.3.1 Action L.1 — RTS Instrumentation
- 3.3.1 Action L.1 Bases — RTS Instrumentation
- 3.4.5 LCO Note a — RCS Loops – MODE 3
- 3.4.5 Action D.2 — RCS Loops – MODE 3
- 3.4.5 Action D.2 Bases — RCS Loops – MODE 3
- 3.4.6 LCO Note 1.a — RCS Loops – MODE 4
- 3.4.6 Action B.1 — RCS Loops – MODE 4
- 3.4.7 LCO Note 1.a — RCS Loops – MODE 5, Loops Filled
- 3.4.7 Action B.1 — RCS Loops – MODE 5, Loops Filled
- 3.4.8 LCO Note 1.b — RCS Loops – MODE 5, Loops Not Filled
- 3.4.8 Action B.1 — RCS Loops – MODE 5, Loops Not Filled
- 3.8.2 Action A.2.3 — AC Sources – Shutdown
- 3.8.2 Action A.2.3 Bases — AC Sources – Shutdown
- 3.8.2 Action B.3 — AC Sources – Shutdown
- 3.8.2 Action B.3 Bases — AC Sources – Shutdown

- 3.8.5 Action A.2.3 DC Sources – Shutdown
- 3.8.5 Action A.2.3 Bases DC Sources – Shutdown
- 3.8.8 Action A.2.3 Inverters – Shutdown
- 3.8.8 Action A.2.3 Bases Inverters – Shutdown
- 3.8.10 Action A.2.3 Distribution Systems – Shutdown
- 3.8.10 Action A.2.3 Bases Distribution Systems – Shutdown
- 3.9.1 Action A.3 Bases Boron Concentration (minor editorial change)
- 3.9.3 Action A.2 Nuclear Instrumentation
- 3.9.5 LCO Note RHR and Coolant Circulation – High Water Level
- 3.9.5 Action A.1 RHR and Coolant Circulation – High Water Level
- 3.9.6 Action B.1 RHR and Coolant Circulation – Low Water Level

The following TSTF-286 TS changes are applicable to DCPP and are incorporated with minor editorial changes identical to those previously approved for H. B. Robinson, Unit 2:

- 3.9.1 Action A.2 Bases Boron Concentration
- 3.9.3 Action A.2 Bases Nuclear Instrumentation
- 3.9.5 LCO Note Bases RHR and Coolant Circulation – High Water Level
- 3.9.5 Action A.1 Bases RHR and Coolant Circulation – High Water Level
- 3.9.6 Action B.1 Bases RHR and Coolant Circulation – Low Water Level

The following change is in addition to those contained in TSTF-286; however, it is directly related to the TSTF-286 change to the 3.9.3 Action A.2 Bases, as discussed in Section 2.0 of Enclosure 1, "Description of Proposed Amendment." This was an oversight in TSTF-286. The list of affected TS in TSTF-286 included "Action 3.9.3.B Bases, Nuclear Instrumentation, NUREG-1431 Only"; however, there were no changes to the Action 3.9.3.B Bases marked on page B 3.9-9 of the traveler.

- 3.9.3 Action B.2 Bases Nuclear Instrumentation

The following TSTF-286 TS changes are not applicable to DCPP and are therefore not incorporated:

• 3.3.9 Action B.1	BDMS
• 3.3.9 Action B.1 Bases	BDMS
• 3.4.18 LCO Note a	RCS Isolated Loop Startup
• SR 3.4.18.2	RCS Isolated Loop Startup
• 3.4.18 Background Bases	RCS Isolated Loop Startup
• SR 3.4.18.2 Bases	RCS Isolated Loop Startup

The following changes in the list of affected TS in TSTF-286 are not applicable to NUREG-1431 (Westinghouse plants) and are therefore not incorporated:

• Action 3.4.5.C	RCS Loops – MODE 3
• Action 3.4.5.C Bases	RCS Loops – MODE 3
• Action 3.9.2.A	Nuclear Instrumentation
• Action 3.9.2.A Bases	Nuclear Instrumentation
• Action 3.9.2.B Bases	Nuclear Instrumentation
• Action 3.3.9.B	Source Range Neutron Flux
• Action 3.3.9.B Bases	Source Range Neutron Flux
• Action 3.3.10.B	Intermediate Range Neutron Flux
• Action 3.3.10.B Bases	Intermediate Range Neutron Flux
• LCO 3.9.4	DHR and Coolant Circulation – High Water Level
• LCO 3.9.4 Bases	DHR and Coolant Circulation – High Water Level
• Action 3.9.4.A	DHR and Coolant Circulation – High Water Level
• Action 3.9.4.A Bases	DHR and Coolant Circulation – High Water Level
• Action 3.9.5.B	DHR and Coolant Circulation – Low Water Level
• Action 3.9.5.B Bases	DHR and Coolant Circulation – Low Water Level
• Action 3.3.8.A Bases	CRIS (Analog)
• Action 3.3.8.C	CRIS (Analog)
• Action 3.3.9.A Bases	CRIS (Digital)
• Action 3.3.9.C	CRIS (Digital)
• Action 3.3.13.A	[Logarithmic] Power Monitoring Channels (Analog)
• Action 3.3.13.A	[Logarithmic] Power Monitoring Channels (Digital)

• Action 3.3.13.A Bases	[Logarithmic] Power Monitoring Channels (Analog)
• Action 3.3.13.A Bases	[Logarithmic] Power Monitoring Channels (Digital)
• LCO 3.9.4	SDC and Coolant Circulation – High Water Level
• LCO 3.9.4 Bases	SDC and Coolant Circulation – High Water Level
• Action 3.9.4.A	SDC and Coolant Circulation – High Water Level
• Action 3.9.4.A Bases	SDC and Coolant Circulation – High Water Level
• Action 3.9.5.B	SDC and Coolant Circulation – Low Water Level
• Action 3.9.5.B Bases	SDC and Coolant Circulation – Low Water Level

Enclosure 2
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MARKUP OF TECHNICAL SPECIFICATIONS

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One channel inoperable.	----------NOTE---------- The inoperable channel, or one additional channel for functions 6, 7, and 8.b may be bypassed for up to 4 hours for surveillance testing of other channels. For functions 2.b, 3.a, 3.b, and 14.a only the inoperable channel may be bypassed for surveillance testing of other channels. ----------	
	E.1 Place channel in trip. OR	6 hours
	E.2 Be in MODE 3.	12 hours
F. One Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6. OR	24 hours
	F.2 Increase THERMAL POWER to > P-10.	24 hours
G. Two Intermediate Range Neutron Flux channels inoperable.	G.1 Suspend operations involving positive reactivity additions. AND	Immediately INSERT 1
	G.2 Reduce THERMAL POWER to < P-6.	2 hours
H. Not used		
I. One Source Range Neutron Flux channel inoperable.	I.1 Suspend operations involving positive reactivity additions.	Immediately INSERT 2
J. Two Source Range Neutron Flux channels inoperable.	J.1 Open reactor trip breakers (RTBs).	Immediately

(continued)

INSERT 1

G.1	----------NOTE---------- Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. ---------- Suspend operations involving positive reactivity additions.

INSERT 2

I.1	----------NOTE---------- Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. ---------- Suspend operations involving positive reactivity additions.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
K. One Source Range Neutron Flux channel inoperable.	K.1 Restore channel to OPERABLE status. OR K.2.1 Initiate action to fully insert all rods. AND K.2.2 Place the Control Rod System in a condition incapable of rod withdrawal.	48 hours 48 hours 49 hours
L. Required Source Range Neutron Flux channel inoperable.	L.1 Suspend operations involving positive reactivity additions. AND L.2 Perform SR 3.1.1.1.	Immediately INSERT 3 1 hour AND Once per 12 hours thereafter
M. One channel inoperable.	----------NOTE---------- The inoperable channel or one additional channel for function 8.a may be bypassed for up to 4 hours for surveillance testing of other channels. For functions 9, 10, 12, and 13, only the inoperable channel may be bypassed for surveillance testing of other channels. ---------- M.1 Place channel in trip. OR M.2 Reduce THERMAL POWER to < P-7.	 6 hours 12 hours
N. Not used		

(continued)

INSERT 3

L.1	----------NOTE---------- Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SDM. ---------- Suspend operations involving positive reactivity additions.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.5 RCS Loops-MODE 3

LCO 3.4.5 Two RCS loops shall be OPERABLE, and either:

a. Two RCS loops shall be in operation when the Rod Control System is capable of rod withdrawal; or

b. One RCS loop shall be in operation when the Rod Control System is not capable of rod withdrawal.

----------NOTE----------

All reactor coolant pumps may be removed from operation for ≤ 1 hour per 8 hour period provided:

INSERT 4

a. No operations are permitted that would cause reduction of the RCS boron concentration; and

b. Core outlet temperature is maintained at least 10°F below saturation temperature.

APPLICABILITY: MODE 3.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required RCS loop inoperable.	A.1	Restore required RCS loop to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 4.	12 hours
C. One required RCS loop not in operation, with Rod Control System capable of rod withdrawal.	C.1	Restore required RCS loop to operation.	1 hour
	OR		
	C.2	Place the Rod Control System in a condition incapable of rod withdrawal.	1 hour

(continued)

INSERT 4

No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Four RCS loops inoperable. OR No RCS loop in operation.	D.1 Place the Rod Control System in a condition incapable of rod withdrawal. AND D.2 Suspend all operations involving a reduction of RCS boron concentration. AND D.3 Initiate action to restore one RCS loop to OPERABLE status and operation.	Immediately Immediately Immediately

INSERT 5

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.5.1	Verify required RCS loops are in operation.	12 hours
SR 3.4.5.2	Verify steam generator secondary side water levels are ≥ 15% for required RCS loops.	12 hours
SR 3.4.5.3	Verify correct breaker alignment and indicated power are available to the required pump that is not in operation.	7 days

INSERT 5

Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops-MODE 4

LCO 3.4.6 Two loops consisting of any combination of RCS loops and residual heat removal (RHR) loops shall be OPERABLE, and one loop shall be in operation.

----------NOTES----------

1. All reactor coolant pumps (RCPs) and RHR pumps may be removed from operation for ≤ 1 hour per 8 hour period provided:
   a. No operations are permitted that would cause reduction of the RCS boron concentration; and INSERT 6
   b. Core outlet temperature is maintained at least ~~10°F below~~ saturation temperature.
2. No RCP shall be started with any RCS cold leg temperature ≤ Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR unless the pressurizer water level is less than 50%, OR the secondary side water temperature of each steam generator (SG) is < 50°F above each of the RCS cold leg temperatures.

APPLICABILITY: MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required loop inoperable.	A.1 Initiate action to restore a second loop to OPERABLE status. AND A.2 ----------NOTE---------- Only required if one RHR loop is OPERABLE. ---------- Be in MODE 5.	Immediately 24 hours

(continued)

INSERT 6

No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Two required loops inoperable. OR No RCS or RHR loop in operation.	B.1 Suspend all operations involving a reduction of RCS boron concentration. AND B.2 Initiate action to restore one loop to OPERABLE status and operation.	Immediately (Insert 7) Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.6.1	Verify one RHR or RCS loop is in operation.	12 hours
SR 3.4.6.2	Verify SG secondary side water levels are ≥ 15% for required RCS loops.	12 hours
SR 3.4.6.3	Verify correct breaker alignment and indicated power are available to the required pump that is not in operation.	7 days

INSERT 7

Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops-MODE 5, Loops Filled

LCO 3.4.7 One residual heat removal (RHR) loop shall be OPERABLE and in operation, and either:

a. One additional RHR loop shall be OPERABLE; or

b. The secondary side water level of at least two steam generators (SGs) shall be ≥ 15 %.

----------NOTES----------

1. The RHR pump of the loop in operation may be removed from operation for ≤ 1 hour per 8 hour period provided:
   a. No operations are permitted that would cause reduction of the RCS boron concentration; and (INSERT 8)
   b. Core outlet temperature is maintained ~~at least 10°F~~ below saturation temperature.
2. One required RHR loop may be inoperable for up to 2 hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.
3. No reactor coolant pump shall be started with any RCS cold leg temperature ≤ Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR unless the pressurizer water level is less than 50%, OR the secondary side water temperature of each SG is < 50°F above each of the RCS cold leg temperatures.
4. All RHR loops may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

APPLICABILITY: MODE 5 with RCS loops filled

INSERT 8

No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One RHR loop inoperable. AND Required SGs secondary side water levels not within limits.	A.1 OR A.2	Initiate action to restore a second RHR loop to OPERABLE status. Initiate action to restore required SG secondary side water levels to within limits.	Immediately Immediately
B. Required RHR loops inoperable. OR No RHR loop in operation.	B.1 AND B.2	Suspend all operations involving a reduction of RCS boron concentration. Initiate action to restore one RHR loop to OPERABLE status and operation.	Immediately INSERT 9 Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.7.1	Verify one RHR loop is in operation.	12 hours
SR 3.4.7.2	Verify SG secondary side water level is ≥ 15% in required SGs.	12 hours
SR 3.4.7.3	Verify correct breaker alignment and indicated power are available to the required RHR pump that is not in operation.	7 days

INSERT 9

Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 RCS Loops-MODE 5, Loops Not Filled

LCO 3.4.8 Two residual heat removal (RHR) loops shall be OPERABLE and one RHR loop shall be in operation.

----------NOTES----------

1. All RHR pumps may be removed from operation for ≤ 1 hour provided:
   a. The core outlet temperature is maintained at least 10°F below saturation temperature.
   b. No operations are permitted that would cause a reduction of the RCS boron concentration; and
   c. No draining operations to further reduce the RCS water volume are permitted.
2. One RHR loop may be inoperable for ≤ 2 hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.

APPLICABILITY: MODE 5 with RCS loops not filled.

----------NOTE----------

While this LCO is not met, entry into MODE 5, Loops Not Filled, from MODE 5, Loops Filled, is not permitted.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RHR loop inoperable.	A.1 Initiate action to restore RHR loop to OPERABLE status.	Immediately
B. Required RHR loops inoperable. OR No RHR loop in operation.	B.1 Suspend all operations involving reduction in RCS boron concentration. AND B.2 Initiate action to restore one RHR loop to OPERABLE status and operation.	Immediately Immediately

INSERT 10

No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

INSERT 11

Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2.3	Initiate action to suspend operations involving positive reactivity additions.	Immediately
		AND	
	A.2.4	Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately
B. The required DG inoperable.	B.1	Suspend CORE ALTERATIONS.	Immediately
OR	AND		
The required supply train of the DFO transfer system inoperable.	B.2	Suspend movement of irradiated fuel assemblies.	Immediately
	AND		
	B.3	Initiate action to suspend operations involving positive reactivity additions.	Immediately
	AND		
	B.4	Initiate action to restore required DG to OPERABLE status.	Immediately

INSERT 12

INSERT 12

INSERT 12

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

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources-Shutdown

LCO 3.8.5 The Class 1E DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems-Shutdown."

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	A.1	Declare affected required feature(s) inoperable.	Immediately
	OR		
	A.2.1	Suspend CORE ALTERATIONS.	Immediately
		AND	
	A.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
		AND	
	A.2.3	Initiate action to suspend operations involving positive reactivity additions.	Immediately
		AND	
	A.2.4	Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately

INSERT 13

INSERT 13

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

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters-Shutdown

LCO 3.8.8 The Class 1E UPS Inverters shall be OPERABLE to support the onsite Class 1E 120 VAC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems-Shutdown."

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required inverters inoperable.	A.1	Declare affected required feature(s) inoperable.	Immediately
	OR		
	A.2.1	Suspend CORE ALTERATIONS.	Immediately
		AND	
	A.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
		AND	
	A.2.3	Initiate action to suspend operations involving positive reactivity additions.	Immediately
		AND	
	A.2.4	Initiate action to restore required inverters to OPERABLE status.	Immediately

INSERT A

INSERT 14

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

3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems-Shutdown

LCO 3.8.10 The necessary portion of the Class 1E AC, DC, and 120 VAC vital bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required AC, DC, or 120 VAC vital bus electrical power distribution subsystems inoperable.	A.1	Declare associated supported required feature(s) inoperable.	Immediately
	OR		
	A.2.1	Suspend CORE ALTERATIONS.	Immediately
		AND	
	A.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
		AND	
	A.2.3	Initiate action to suspend operations involving positive reactivity additions.	Immediately
		AND	

INSERT 15

(continued)

INSERT 15

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

3.9 REFUELING OPERATIONS

3.9.3 Nuclear Instrumentation

LCO 3.9.3 Two source range neutron flux monitors shall be OPERABLE.

APPLICABILITY: MODE 6

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required source range neutron flux monitor inoperable.	A.1	Suspend CORE ALTERATIONS except for latching control rod drive shafts and friction testing of individual control rods.	Immediately
	AND		
	A.2	Suspend positive reactivity additions ~~except for latching control rod drive shafts and friction testing of individual control rods~~.	Immediately
B. Two required source range neutron flux monitors inoperable.	B.1	Initiate action to restore one source range neutron flux monitor to OPERABLE status.	Immediately
	AND		
	B.2	Perform SR 3.9.1.1.	Once per 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.3.1	Perform CHANNEL CHECK.	12 hours
SR 3.9.3.2	----------NOTE---------- Neutron detectors are excluded from CHANNEL CALIBRATION. ---------- Perform CHANNEL CALIBRATION.	24 months

INSERT 16

Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of LCO 3.9.1.

3.9 REFUELING OPERATIONS

3.9.5 Residual Heat Removal (RHR) and Coolant Circulation - High Water Level

LCO 3.9.5 One RHR loop shall be OPERABLE and in operation.

---NOTE---

The required RHR loop may be removed from operation for ≤ 1 hour per 8 hour period, provided no operations are permitted that would cause reduction of the Reactor Coolant System boron concentration. INSERT 17

The required RHR loop maybe removed from operation for ≤ 2 hours per 8 hour period for performance of leak testing the RHR suction isolation valves provided no operations are permitted that would cause reduction of the ~~Reactor Coolant System~~ RCS boron concentration.

APPLICABILITY: MODE 6 with the water level ≥ 23 ft above the top of reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. RHR loop requirements not met.	A.1	Suspend operations involving a reduction in reactor coolant boron concentration. INSERT 18	Immediately
	AND		
	A.2	Suspend loading irradiated fuel assemblies in the core.	Immediately
	AND		
	A.3	Initiate action to satisfy RHR loop requirements.	Immediately
	AND		
	A.4	Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere.	4 hours

INSERT 17

introduction into the Reactor Coolant System (RCS), coolant with boron concentration less than that required to meet the minimum required boron concentration of LCO 3.9.1.

INSERT 18

Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of LCO 3.9.1.

3.9 REFUELING OPERATIONS

3.9.6 Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level

LCO 3.9.6 Two RHR loops shall be OPERABLE, and one RHR loop shall be in operation.

APPLICABILITY: MODE 6 with the water level < 23 ft above the top of reactor vessel flange.

---NOTE---
While this LCO is not met, entry into a MODE or other specified condition in the APPLICABILITY is not permitted.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Less than the required number of RHR loops OPERABLE.	A.1	Initiate action to restore required RHR loops to OPERABLE status.	Immediately
	OR		
	A.2	Initiate action to establish ≥ 23 ft of water above the top of reactor vessel flange.	Immediately
B. No RHR loop in operation.	B.1	Suspend operations involving a reduction in reactor coolant boron concentration.	Immediately
	AND		
	B.2	Initiate action to restore one RHR loop to operation.	Immediately
	AND		
	B.3	Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere.	4 hours

INSERT 19

INSERT 19

Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of LCO 3.9.1.

RETYPED TECHNICAL SPECIFICATIONS

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One channel inoperable.	----------NOTE---------- The inoperable channel, or one additional channel for functions 6, 7, and 8.b may be bypassed for up to 4 hours for surveillance testing of other channels. For functions 2.b, 3.a, 3.b, and 14.a only the inoperable channel may be bypassed for surveillance testing of other channels. ---------- E.1 Place channel in trip. OR E.2 Be in MODE 3.	 6 hours 12 hours
F. One Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6. OR F.2 Increase THERMAL POWER to > P-10.	24 hours 24 hours
G. Two Intermediate Range Neutron Flux channels inoperable.	G.1 ----------NOTE---------- Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. ---------- Suspend operations involving positive reactivity additions. AND G.2 Reduce THERMAL POWER to < P-6.	Immediately 2 hours
H. Not used		

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. One Source Range Neutron Flux channel inoperable.	I.1 ----------NOTE---------- Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. ---------- Suspend operations involving positive reactivity additions.	Immediately
J. Two Source Range Neutron Flux channels inoperable.	J.1 Open reactor trip breakers (RTBs).	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
K. One Source Range Neutron Flux channel inoperable.	K.1 Restore channel to OPERABLE status. OR K.2.1 Initiate action to fully insert all rods. AND K.2.2 Place the Control Rod System in a condition incapable of rod withdrawal.	48 hours 48 hours 49 hours
L. Required Source Range Neutron Flux channel inoperable.	L.1 ----------NOTE---------- Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SDM. ---------- Suspend operations involving positive reactivity additions. AND L.2 Perform SR 3.1.1.1.	Immediately 1 hour AND Once per 12 hours thereafter
M. One channel inoperable.	----------NOTE---------- The inoperable channel or one additional channel for function 8.a may be bypassed for up to 4 hours for surveillance testing of other channels. For functions 9, 10, 12, and 13, only the inoperable channel may be bypassed for surveillance testing of other channels. ---------- M.1 Place channel in trip. OR M.2 Reduce THERMAL POWER to < P-7.	 6 hours 12 hours
N. Not used		

(continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.5 RCS Loops-MODE 3

LCO 3.4.5 Two RCS loops shall be OPERABLE, and either:

a. Two RCS loops shall be in operation when the Rod Control System is capable of rod withdrawal; or

b. One RCS loop shall be in operation when the Rod Control System is not capable of rod withdrawal.

----------NOTE----------

All reactor coolant pumps may be removed from operation for ≤ 1 hour per 8 hour period provided:

a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

b. Core outlet temperature is maintained at least 10°F below saturation temperature.

APPLICABILITY: MODE 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required RCS loop inoperable.	A.1 Restore required RCS loop to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 4.	12 hours
C. One required RCS loop not in operation, with Rod Control System capable of rod withdrawal.	C.1 Restore required RCS loop to operation. OR	1 hour
	C.2 Place the Rod Control System in a condition incapable of rod withdrawal.	1 hour

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Four RCS loops inoperable. OR No RCS loop in operation.	D.1	Place the Rod Control System in a condition incapable of rod withdrawal.	Immediately
	AND		
	D.2	Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.	Immediately
	AND		
	D.3	Initiate action to restore one RCS loop to OPERABLE status and operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.5.1	Verify required RCS loops are in operation.	12 hours
SR 3.4.5.2	Verify steam generator secondary side water levels are $\geq$ 15% for required RCS loops.	12 hours
SR 3.4.5.3	Verify correct breaker alignment and indicated power are available to the required pump that is not in operation.	7 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops-MODE 4

LCO 3.4.6 Two loops consisting of any combination of RCS loops and residual heat removal (RHR) loops shall be OPERABLE, and one loop shall be in operation.

----------NOTES----------

1. All reactor coolant pumps (RCPs) and RHR pumps may be removed from operation for ≤ 1 hour per 8 hour period provided:
   a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and
   b. Core outlet temperature is maintained at least 10°F below saturation temperature.
2. No RCP shall be started with any RCS cold leg temperature ≤ Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR unless the pressurizer water level is less than 50%, OR the secondary side water temperature of each steam generator (SG) is < 50°F above each of the RCS cold leg temperatures.

APPLICABILITY: MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required loop inoperable.	A.1 Initiate action to restore a second loop to OPERABLE status. AND A.2 ----------NOTE---------- Only required if one RHR loop is OPERABLE. ---------- Be in MODE 5.	Immediately 24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Two required loops inoperable. OR No RCS or RHR loop in operation.	B.1 Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1. AND B.2 Initiate action to restore one loop to OPERABLE status and operation.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.6.1	Verify one RHR or RCS loop is in operation.	12 hours
SR 3.4.6.2	Verify SG secondary side water levels are ≥ 15% for required RCS loops.	12 hours
SR 3.4.6.3	Verify correct breaker alignment and indicated power are available to the required pump that is not in operation.	7 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops-MODE 5, Loops Filled

LCO 3.4.7 One residual heat removal (RHR) loop shall be OPERABLE and in operation, and either:

a. One additional RHR loop shall be OPERABLE; or

b. The secondary side water level of at least two steam generators (SGs) shall be ≥ 15 %.

----------NOTES----------

1. The RHR pump of the loop in operation may be removed from operation for ≤ 1 hour per 8 hour period provided:

   a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. One required RHR loop may be inoperable for up to 2 hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.

3. No reactor coolant pump shall be started with any RCS cold leg temperature ≤ Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR unless the pressurizer water level is less than 50%, OR the secondary side water temperature of each SG is < 50°F above each of the RCS cold leg temperatures.

4. All RHR loops may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

APPLICABILITY: MODE 5 with RCS loops filled

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RHR loop inoperable. AND Required SGs secondary side water levels not within limits.	A.1 Initiate action to restore a second RHR loop to OPERABLE status. OR A.2 Initiate action to restore required SG secondary side water levels to within limits.	Immediately Immediately
B. Required RHR loops inoperable. OR No RHR loop in operation.	B.1 Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1. AND B.2 Initiate action to restore one RHR loop to OPERABLE status and operation.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.7.1	Verify one RHR loop is in operation.	12 hours
SR 3.4.7.2	Verify SG secondary side water level is ≥ 15% in required SGs.	12 hours
SR 3.4.7.3	Verify correct breaker alignment and indicated power are available to the required RHR pump that is not in operation.	7 days

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 RCS Loops-MODE 5, Loops Not Filled

LCO 3.4.8 Two residual heat removal (RHR) loops shall be OPERABLE and one RHR loop shall be in operation.

----------NOTES----------

1. All RHR pumps may be removed from operation for ≤ 1 hour provided:
   a. The core outlet temperature is maintained at least 10°F below saturation temperature.
   b. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and
   c. No draining operations to further reduce the RCS water volume are permitted.
2. One RHR loop may be inoperable for ≤ 2 hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.

APPLICABILITY: MODE 5 with RCS loops not filled.

----------NOTE----------

While this LCO is not met, entry into MODE 5, Loops Not Filled, from MODE 5, Loops Filled, is not permitted.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One RHR loop inoperable.	A.1	Initiate action to restore RHR loop to OPERABLE status.	Immediately
B. Required RHR loops inoperable. OR No RHR loop in operation.	B.1	Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.	Immediately
	AND		
	B.2	Initiate action to restore one RHR loop to OPERABLE status and operation.	Immediately

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2.3	Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
		AND	
	A.2.4	Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately
B. The required DG inoperable.	B.1	Suspend CORE ALTERATIONS.	Immediately
OR	AND		
The required supply train of the DFO transfer system inoperable.	B.2	Suspend movement of irradiated fuel assemblies.	Immediately
	AND		
	B.3	Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	AND		
	B.4	Initiate action to restore required DG to OPERABLE status.	Immediately

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources-Shutdown

LCO 3.8.5 The Class 1E DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems-Shutdown."

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	A.1	Declare affected required feature(s) inoperable.	Immediately
	OR		
	A.2.1	Suspend CORE ALTERATIONS.	Immediately
		AND	
	A.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
		AND	
	A.2.3	Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
		AND	
	A.2.4	Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters-Shutdown

LCO 3.8.8 The Class 1E UPS Inverters shall be OPERABLE to support the onsite Class 1E 120 VAC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems-Shutdown."

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required inverters inoperable.	A.1	Declare affected required feature(s) inoperable.	Immediately
	OR		
	A.2.1	Suspend CORE ALTERATIONS.	Immediately
		AND	
	A.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
		AND	
	A.2.3	Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
		AND	
	A.2.4	Initiate action to restore required inverters to OPERABLE status.	Immediately

3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems-Shutdown

LCO 3.8.10 The necessary portion of the Class 1E AC, DC, and 120 VAC vital bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required AC, DC, or 120 VAC vital bus electrical power distribution subsystems inoperable.	A.1	Declare associated supported required feature(s) inoperable.	Immediately
	OR		
	A.2.1	Suspend CORE ALTERATIONS.	Immediately
		AND	
	A.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
		AND	
	A.2.3	Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
		AND	

(continued)

3.9 REFUELING OPERATIONS

3.9.3 Nuclear Instrumentation

LCO 3.9.3 Two source range neutron flux monitors shall be OPERABLE.

APPLICABILITY: MODE 6

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required source range neutron flux monitor inoperable.	A.1	Suspend CORE ALTERATIONS except for latching control rod drive shafts and friction testing of individual control rods.	Immediately
	AND		
	A.2	Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of LCO 3.9.1.	Immediately
B. Two required source range neutron flux monitors inoperable.	B.1	Initiate action to restore one source range neutron flux monitor to OPERABLE status.	Immediately
	AND		
	B.2	Perform SR 3.9.1.1.	Once per 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.3.1	Perform CHANNEL CHECK.	12 hours
SR 3.9.3.2	----------NOTE---------- Neutron detectors are excluded from CHANNEL CALIBRATION. ---------- Perform CHANNEL CALIBRATION.	24 months

3.9 REFUELING OPERATIONS

3.9.5 Residual Heat Removal (RHR) and Coolant Circulation - High Water Level

LCO 3.9.5 One RHR loop shall be OPERABLE and in operation.

----------NOTE----------

The required RHR loop may be removed from operation for ≤ 1 hour per 8 hour period, provided no operations are permitted that would cause introduction into the Reactor Coolant System (RCS), coolant with boron concentration less than that required to meet the minimum required boron concentration of LCO 3.9.1.

The required RHR loop maybe removed from operation for ≤ 2 hours per 8 hour period for performance of leak testing the RHR suction isolation valves provided no operations are permitted that would cause reduction of the RCS boron concentration.

APPLICABILITY: MODE 6 with the water level ≥ 23 ft above the top of reactor vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. RHR loop requirements not met.	A.1	Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of LCO 3.9.1.	Immediately
	AND		
	A.2	Suspend loading irradiated fuel assemblies in the core.	Immediately
	AND		
	A.3	Initiate action to satisfy RHR loop requirements.	Immediately
	AND		
	A.4	Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere.	4 hours

3.9 REFUELING OPERATIONS

3.9.6 Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level

LCO 3.9.6 Two RHR loops shall be OPERABLE, and one RHR loop shall be in operation.

APPLICABILITY: MODE 6 with the water level < 23 ft above the top of reactor vessel flange.

----------NOTE----------
While this LCO is not met, entry into a MODE or other specified condition in the APPLICABILITY is not permitted.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Less than the required number of RHR loops OPERABLE.	A.1	Initiate action to restore required RHR loops to OPERABLE status.	Immediately
	OR		
	A.2	Initiate action to establish ≥ 23 ft of water above the top of reactor vessel flange.	Immediately
B. No RHR loop in operation.	B.1	Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of LCO 3.9.1.	Immediately
	AND		
	B.2	Initiate action to restore one RHR loop to operation.	Immediately
	AND		
	B.3	Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere.	4 hours

PROPOSED TECHNICAL SPECIFICATION BASES CHANGES

BASES

ACTIONS (continued)

F.1 and F.2 (Continued)

redundant capability afforded by the redundant OPERABLE channel, the overlap of the power range detectors, and the low probability of its failure during this period. This action does not require the inoperable channel to be tripped because the Function uses one-out-of-two logic. Tripping one channel would trip the reactor. Thus, the Required Actions specified in this Condition are only applicable when channel failure does not result in reactor trip.

G.1 and G.2

Condition G applies to two inoperable Intermediate Range Neutron Flux trip channels in MODE 2 when THERMAL POWER is above the P-6 setpoint and below the P-10 setpoint. Required Actions specified in this Condition are only applicable when channel failures do not result in reactor trip. Above the P-6 setpoint and below the P-10 setpoint, the NIS intermediate range detector performs the monitoring Functions. With no intermediate range channels OPERABLE, the Required Actions are to suspend operations involving positive reactivity additions immediately. This will preclude any power level increase since there are no OPERABLE Intermediate Range Neutron Flux channels. The operator must also reduce THERMAL POWER below the P-6 setpoint within two hours. Below P-6, the Source Range Neutron Flux channels will be able to monitor the core power level. The Completion Time of 2 hours will allow a slow and controlled power reduction to less than the P-6 setpoint and takes into account the low probability of occurrence of an event during this period that may require the protection afforded by the NIS Intermediate Range Neutron Flux trip.

INSERT BASES 1

H.1 - Not used

I.1

Condition I applies to one inoperable Source Range Neutron Flux trip channel when in MODE 2, below the P-6 setpoint, and performing a reactor startup. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With one of the two channels inoperable, operations involving positive reactivity additions shall be suspended immediately.

This will preclude any power escalation. With only one source range channel OPERABLE, core protection is severely reduced and any actions that add positive reactivity to the core must be suspended immediately.

INSERT BASES 2

(continued)

INSERT BASES 1

Required Action G.1 is modified by a Note to indicate that normal plant control operations that individually add limited positive reactivity (i.e., temperature or boron concentration fluctuations associated with RCS inventory management or temperature control) are not precluded by this Action, provided the SDM limits specified in the COLR are met and the requirements of LCOs 3.1.5, 3.1.6, and 3.4.2 are met.

INSERT BASES 2

Required Action I.1 is modified by a Note to indicate that normal plant control operations that individually add limited positive reactivity (i.e., temperature or boron concentration fluctuations associated with RCS inventory management or temperature control) are not precluded by this Action, provided the SDM limits specified in the COLR are met and the requirements of LCOs 3.1.5, 3.1.6, and 3.4.2 are met.

BASES

ACTIONS (continued)

J.1

Condition J applies to two inoperable Source Range Neutron Flux trip channels when in MODE 2, below the P-6 setpoint, and performing a reactor startup, or in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted. With the unit in this Condition, below P-6, the NIS source range performs the monitoring and protection functions. With both source range channels inoperable, the RTBs must be opened immediately. With the RTBs open, the core is in a more stable condition and the unit enters Condition L.

K.1, K.2.1, and K.2.2

Condition K applies to one inoperable source range channel in MODE 3, 4, or 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted. With the unit in this Condition, below P-6, the NIS source range performs the protection functions. With one of the source range channels inoperable, 48 hours is allowed to restore it to an OPERABLE status. If the channel cannot be returned to an OPERABLE status, action must be initiated within the same 48 hours to fully insert all rods. 1 additional hour is allowed to place the Rod Control System in a condition incapable of rod withdrawal (e.g., by de-energizing all CRDMs, by opening the RTBs, or by de-energizing the motor generator (MG) sets). Once these ACTIONS are completed the core is in a more stable condition. The allowance of 48 hours to restore the channel to OPERABLE status, and the additional hour to place the Rod Control System in a condition incapable of rod withdrawal, are justified in Reference 7.

L.1, L.2, ~~and L.3~~ and

Condition L applies when the required number of OPERABLE Source Range Neutron Flux channels is not met in MODE 3, 4, or 5 with the RTBs open or with the Rod Control System incapable of rod withdrawal and all rods fully inserted. With the unit in this Condition, the NIS source range performs a monitoring function. With less than the required number of source range channels OPERABLE, operations involving positive reactivity additions shall be suspended immediately. This will preclude any power escalation.

Also, the SDM must be verified within 1 hour and once every 12 hours thereafter as per SR 3.1.1.1, SDM verification. With no source range channels OPERABLE, core protection is severely reduced. Verifying the SDM within 1 hour allows sufficient time to perform the calculations and determine that the SDM requirements are met. The SDM must

(continued)

BASES

ACTIONS

L.1, L.2, ~~and L.3~~ (Continued)

also be verified once per 12 hours thereafter to ensure that the core reactivity has not changed. Required Action L.1 precludes any positive reactivity additions; therefore, core reactivity should not be increasing, and a 12 hour Frequency is adequate. The Completion Times of within 1 hour and once per 12 hours are based on operating experience in performing the Required Actions and the knowledge that unit conditions will change slowly.

INSERT BASES 3

M.1 and M.2

Condition M applies to the following reactor trip Functions:

- Pressurizer Pressure — Low;
- Pressurizer Water Level — High;
- Reactor Coolant Flow — Low;
- RCP Breaker Position ;
- Undervoltage RCPs; and
- Underfrequency RCPs.

With one channel inoperable, the inoperable channel must be placed in the tripped condition within 6 hours. For the Pressurizer Pressure - Low, Pressurizer Water Level - High, Undervoltage RCPs, and Underfrequency RCPs trip Functions, placing the channel in the tripped condition when above the P-7 setpoint results in a partial trip condition requiring only one additional channel to initiate a reactor trip. For the Reactor Coolant Flow - Low trip Function, placing the channel in the tripped condition results in a partial trip condition requiring only one additional channel to initiate a reactor trip above the P-7 and P-8 setpoints. These Functions do not have to be OPERABLE below the P-7 setpoint because there are no loss of flow trips below the P-7 setpoint. The 6 hours allowed to place the channel in the tripped condition is justified in Reference 7. An additional 6 hours is allowed to reduce THERMAL POWER to below P-7 if the inoperable channel cannot be restored to OPERABLE status or placed in trip within the specified Completion Time. The Reactor Coolant Flow - Low reactor trip function goes from 1 of 4 logic to 2 of 4 logic below the P-8 setpoint; however, the Required Action must take the plant below the P-7 setpoint, if an inoperable channel is not tripped within 6 hours, due to the shared components between this function and the Reactor Coolant Flow - Low trip function.

(continued)

INSERT BASES 3

Required Action L.1 is modified by a Note which permits plant temperature changes provided the temperature change is accounted for in the calculated SDM. Introduction of temperature changes, including temperature increases when operating with a positive MTC, must be evaluated to ensure they do not result in a loss of required SDM.

BASES (continued)

LCO

The purpose of this LCO is to require that at least two RCS loops be OPERABLE. In MODE 3 with the Rod Control System capable of rod withdrawal, two RCS loops must be in operation. Two RCS loops are required to be in operation in MODE 3 with the Rod Control System capable of rod withdrawal due to the postulation of a power excursion because of an inadvertent control rod withdrawal. The required number of RCS loops in operation ensures that the Safety Limit criteria will be met for all of the postulated accidents.

When the Rod Control System is not capable of rod withdrawal, only one RCS loop in operation is necessary to ensure removal of decay heat from the core and homogenous boron concentration throughout the RCS. An additional RCS loop is required to be OPERABLE to ensure that redundancy for heat removal is maintained.

The Note permits all RCPs to be removed from operation for $\leq$ 1 hour per 8 hour period. The purpose of the Note is to perform tests that are required to be performed without flow or pump noise. One of these tests is validation of the pump coastdown curve used as input to a number of accident analyses including a loss of flow accident. This test is generally performed in MODE 3 during the initial startup testing program, and as such should only be performed once. If, however, changes are made to the RCS that would cause a change to the flow characteristics of the RCS, the input values of the coastdown curve must be revalidated by conducting the test again.

Utilization of the Note is permitted provided the following conditions are met, along with any other ~~conditions imposed by~~ test procedures:

(INSERT BASES 4)

a. No operations ~~are permitted that would~~ dilute the RCS boron concentration, ~~thereby maintaining the margin to criticality~~. ~~Boron reduction~~ is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation; and

b. Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

An OPERABLE RCS loop consists of one OPERABLE RCP and one OPERABLE SG in accordance with the Steam Generator Tube Surveillance Program, which has the minimum water level specified in SR 3.4.5.2. An RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required.

(continued)

INSERT BASES 4

with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1, thereby maintaining the margin to criticality. Boron reduction with coolant at boron concentrations less than required to assure the SDM is maintained

BASES

ACTIONS

C.1 and C.2 (continued)

(MG) sets.) When the Rod Control System is capable of rod withdrawal, it is postulated that a power excursion could occur in the event of an inadvertent control rod withdrawal. This mandates having the heat transfer capacity of two RCS loops in operation. If only one loop is in operation, the Rod Control System must not be capable of rod withdrawal. The Completion Time of 1 hour to restore the required RCS loop to operation or to defeat the Rod Control System is adequate to perform these operations in an orderly manner without exposing the unit to risk for an undue time period.

D.1, D.2, and D.3

If four RCS loops are inoperable or no RCS loop is in operation, except as during conditions permitted by the Note in the LCO section, place the Rod Control System in a condition incapable of rod withdrawal, (e.g., all CRDMs must be de-energized by opening the RTBs or de-energizing the MG sets.) All operations involving ~~a reduction of RCS boron concentration~~ must be suspended, and action to restore one of the RCS loops to OPERABLE status and operation must be initiated. Boron dilution requires forced circulation for proper mixing, and opening the RTBs or de-energizing the MG sets removes the possibility of an inadvertent rod withdrawal.

INSERT BASES 5

INSERT BASES 6

The immediate Completion Time reflects the importance of maintaining operation for heat removal. The action to restore must be continued until one loop is restored to OPERABLE status and operation.

SURVEILLANCE REQUIREMENTS

SR 3.4.5.1

This SR requires verification every 12 hours that the required loops are in operation. Verification may include flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The Frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the control room to monitor RCS loop performance.

SR 3.4.5.2

SR 3.4.5.2 requires verification of SG OPERABILITY. SG OPERABILITY is verified by ensuring that the secondary side narrow range water level is $\geq$ 15% for required RCS loops. If the SG secondary side narrow range water level is < 15%, the tubes may become uncovered and the associated loop may not be capable of providing the heat sink for removal of the decay heat. The 12 hour Frequency is considered adequate in view of other indications available in the control room to alert the operator to a loss of SG level.

(continued)

INSERT BASES 5

introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1

INSERT BASES 6

Suspending the introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations.

BASES (continued)

LCO

The purpose of this LCO is to require that at least two loops be OPERABLE in MODE 4 and that one of these loops be in operation. The LCO allows the two loops that are required to be OPERABLE to consist of any combination of RCS loops and RHR loops. Any one loop in operation provides enough flow to remove the decay heat from the core with forced circulation. An additional loop is required to be OPERABLE to provide redundancy for heat removal.

Note 1 permits all RCPs or RHR pumps to be removed from operation for ≤ 1 hour per 8 hour period. The purpose of the Note is to permit tests that are required to be performed without flow or pump noise. 1 hour is adequate to perform the test, and operating experience has shown that boron stratification is not a problem during this short period with no forced flow.

Utilization of Note 1 is permitted provided the following conditions are met along with any other conditions imposed by test procedures:

a. No operations are permitted that would dilute the RCS boron concentration, ~~therefore maintaining the margin to criticality~~. ~~Boron reduction~~ is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation; and

INSERT BASES 7

b. Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

Note 2 requires that the secondary side water temperature of each SG be < 50°F above each of the RCS cold leg temperatures before the start of an RCP with any RCS cold leg temperature ≤ LTOP arming temperature specified in the PTLR (the current limiting temperature for DCPP is 270°F.) Note 2 also includes a DCPP plant specific alternate condition under which a RCP may be started in MODE 4 and in MODE 5 with the loops filled. Note that RCPs may be "bumped" following a condition of RCS depressurization to establish "loops filled" condition. The Note specifies that a RCP may be started if the pressurizer water level is less than 50%. This option of RCP start with pressurizer water level less than 50% supports plant operational flexibility. The open volume in the pressurizer provides space to sustain reactor coolant thermal swell without incurring a possible excessive pressure transient due to energy additions from the SG secondary water. The purpose of conditions to allow initial RCP start when none is running is to prevent a possible low temperature RCS overpressure event due to a thermal transient when a RCP is started. The condition of SG/RCS

(continued)

INSERT BASES 7

with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1, thereby maintaining the margin to criticality. Boron reduction with coolant at boron concentrations less than required to assure the SDM is maintained

BASES

ACTIONS

A.1 and A.2 (continued)

If one required RHR loop is OPERABLE and in operation and there are no RCS loops OPERABLE, an inoperable RCS loop or RHR loop must be restored to OPERABLE status to provide a redundant means for decay heat removal.

If the parameters that are outside the limits cannot be restored, the unit must be brought to MODE 5 within 24 hours. Bringing the unit to MODE 5 is a conservative action with regard to decay heat removal. With only one RHR loop OPERABLE, redundancy for decay heat removal is lost and, in the event of a loss of the remaining RHR loop, it would be safer to initiate that loss from MODE 5 ($\leq$ 200°F) rather than MODE 4 (> 200°F to < 350°F). The Completion Time of 24 hours is a reasonable time, based on operating experience, to reach MODE 5 from MODE 4 in an orderly manner and without challenging plant systems.

B.1 and B.2

If no loop is OPERABLE or in operation, except during conditions permitted by Note 1 in the LCO section, all operations involving ~~a reduction of RCS boron concentration~~ must be suspended and action to restore one RCS or RHR loop to OPERABLE status and operation must be initiated.

INSERT BASES 8

INSERT BASES 9

Boron dilution requires forced RCS circulation from at least one RCP for proper mixing, so that an inadvertent criticality may be prevented. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal. The action to restore must be continued until one loop is restored to OPERABLE status and operation.

SURVEILLANCE REQUIREMENTS

SR 3.4.6.1

This SR requires verification every 12 hours that one RCS loop or RHR loop is in operation. Verification may include flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The Frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the control room to monitor RCS and RHR loop performance.

SR 3.4.6.2

SR 3.4.6.2 requires verification of SG OPERABILITY. SG OPERABILITY is verified by ensuring that the secondary side narrow range water level is $\geq$ 15%. If the SG secondary side narrow range water level is < 15%, the tubes may become uncovered and the

(continued)

INSERT BASES 8

introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1.

INSERT BASES 9

Suspending the introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations.

BASES (continued)

LCO

The purpose of this LCO is to require that at least one of the RHR loops be OPERABLE and in operation with an additional RHR loop OPERABLE or two SGs with secondary side water level ≥ 15%. One RHR loop provides sufficient forced circulation to perform the safety functions of the reactor coolant under these conditions. An additional RHR loop is required to be OPERABLE to meet single failure considerations. However, if the standby RHR loop is not OPERABLE, an acceptable alternate method is two SGs with their secondary side water levels ≥ 15%. Should the operating RHR loop fail, the SGs could be used to remove the decay heat via natural circulation.

Note 1 permits all RHR pumps to be removed from operation ≤ 1 hour per 8 hour period. The purpose of the Note is to permit tests that are required to be performed without flow or pump noise. 1 hour is adequate to perform the test, and operating experience has shown that boron stratification is not likely during this short period with no forced flow.

Utilization of Note 1 is permitted provided the following conditions are met, along with any other conditions imposed by test procedures:

INSERT BASES TO

a. No operations are permitted that would dilute the RCS boron concentration, ~~therefore maintaining the margin to criticality. Boron reduction~~ is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation; and

b. Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

Note 2 allows one RHR loop to be inoperable for a period of up to 2 hours, provided that the other RHR loop is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable loop during the only time when such testing is safe and possible.

Note 3 requires that the secondary side water temperature of each SG be ≤ 50°F above each of the RCS cold leg temperatures before the start of a reactor coolant pump (RCP) with any RCS cold leg temperature ≤ Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR. Note that RCPs may be "bumped" following a condition of RCS depressurization to establish "loops filled" condition.

Note 3 also includes an OR condition for starting a RCP. This condition is a DCPP plant specific alternate condition under which a RCP may be started in MODE 4 and in MODE 5 with the loops filled.

(continued)

INSERT BASES 10

with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1, thereby maintaining the margin to criticality. Boron reduction with coolant at boron concentrations less than required to assure the SDM is maintained

BASES (continued)

ACTIONS

A.1 and A.2

If one RHR loop is inoperable and the required SGs have secondary side water levels < 15%, redundancy for heat removal is lost. Action must be initiated immediately to restore a second RHR loop to OPERABLE status or to restore the required SG secondary side water levels. Either Required Action A.1 or Required Action A.2 will restore redundant heat removal paths. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

B.1 and B.2

INSERT BASES 11

If no RHR loop is in operation, except during conditions permitted by Notes 1 and 4, or if no loop is OPERABLE, all operations involving ~~a reduction of RCS boron concentration~~ must be suspended and action to restore one RHR loop to OPERABLE status and operation must be initiated. To prevent inadvertent criticality during a boron dilution, forced circulation from at least one RHR pump is required to provide proper mixing and preserve the margin to criticality in this type of operation. The immediate Completion Times reflect the importance of maintaining operation for heat removal.

INSERT BASES 12

SURVEILLANCE REQUIREMENTS

SR 3.4.7.1

This SR requires verification every 12 hours that the required loop is in operation. Verification may include flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The Frequency of 12 hours is sufficient considering other indications and alarms available to the operator in the control room to monitor RHR loop performance.

SR 3.4.7.2

Verifying that at least two SGs are OPERABLE by ensuring their secondary side narrow range water levels are ≥ 15% ensures an alternate decay heat removal method via natural circulation in the event that the second RHR loop is not OPERABLE. If both RHR loops are OPERABLE, this Surveillance is not needed. The 12 hour Frequency is considered adequate in view of other indications available in the control room to alert the operator to the loss of SG level.

SR 3.4.7.3

Verification that a second RHR pump is OPERABLE ensures that an additional pump can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available

(continued)

INSERT BASES 11

introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1.

INSERT BASES 12

Suspending the introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.8 RCS Loops - MODES 5, Loops Not Filled

BASES

BACKGROUND	In MODE 5 with the RCS loops not filled, the primary function of the reactor coolant is the removal of decay heat generated in the fuel, and the transfer of this heat to the component cooling water via the residual heat removal (RHR) heat exchangers. The steam generators (SGs) are not available as a heat sink when the loops are not filled. The secondary function of the reactor coolant is to act as a carrier for the soluble neutron poison, boric acid. In MODE 5 with loops not filled, only RHR pumps can be used for coolant circulation. The number of pumps in operation can vary to suit the operational needs. The intent of this LCO is to provide forced flow from at least one RHR pump for decay heat removal and transport and to require that two paths be available to provide redundancy for heat removal.
APPLICABLE SAFETY ANALYSES	In MODE 5, RCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. The RHR loops provide this circulation. The flow provided by one RHR loop is adequate for heat removal and for boron mixing. RCS loops in MODE 5 (loops not filled) have been identified in 10 CFR 50.36(c)(2)(ii) as important contributors to risk reduction.
LCO	The purpose of this LCO is to require that at least two RHR loops be OPERABLE and one of these loops be in operation. An OPERABLE loop is one that has the capability of transferring heat from the reactor coolant at a controlled rate. Heat cannot be removed via the RHR System unless forced flow is used. A minimum of one running RHR pump meets the LCO requirement for one loop in operation. An additional RHR loop is required to be OPERABLE to meet single failure considerations. Note 1 permits all RHR pumps to be removed from operation for $\leq$ 1 hour. The circumstances for stopping both RHR pumps are to be limited to situations when the outage time is short and core outlet temperature is maintained at least 10°F below saturation temperature. ~~The Note prohibits boron dilution or draining operations when RHR forced flow is stopped.~~ INSERT BASES 13 Note 2 allows one RHR loop to be inoperable for a period of $\leq$ 2 hours, provided that the other loop is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable loop during the only time when these tests are safe and possible.

(continued)

INSERT BASES 13

The NOTE prohibits boron dilution with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1 is maintained, or draining operations when RHR forced flow is stopped.

BASES

LCO (continued)

An OPERABLE RHR loop is comprised of an OPERABLE RHR pump capable of providing forced flow to an OPERABLE RHR heat exchanger. RHR pumps are OPERABLE if they are capable of being powered and are able to provide flow if required.

APPLICABILITY

In MODE 5 with loops not filled, this LCO requires core heat removal and coolant circulation by the RHR System. The Applicability is modified by a Note stating that while the LCO is not met, entry into MODE 5, Loops Not Filled, from MODE 5, Loops Filled, is not permitted. This Note specifies an exception to LCO 3.0.4 and would prevent draining the RCS, which would eliminate the possibility of SG heat removal, while the RHR function was degraded.

Operation in other MODES is covered by:

LCO 3.4.4, "RCS Loops - MODES 1 and 2";

LCO 3.4.5, "RCS Loops - MODE 3";

LCO 3.4.6, "RCS Loops - MODE 4";

LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled";

LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level" (MODE 6); and

LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level" (MODE 6).

ACTIONS

A.1

If only one RHR loop is OPERABLE and in operation, redundancy for RHR is lost. Action must be initiated to restore a second loop to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

B.1 and B.2

If no required RHR loops are OPERABLE or in operation, except during conditions permitted by Note 1, all operations involving ~~a reduction of RCS boron concentration~~ must be suspended and action must be initiated immediately to restore an RHR loop to OPERABLE status and operation. Boron dilution requires forced circulation from at least one RHR pump for proper mixing so that inadvertent criticality can be prevented. The immediate Completion Time reflects the importance of maintaining operation for heat removal. The action to restore must continue until one loop is restored to OPERABLE status and operation.

INSERT BASES 14

INSERT BASES 15

(continued)

INSERT BASES 14

introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1

INSERT BASES 15

Suspending the introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations.

BASES

APPLICABILITY (continued)

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The AC power requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.1.

ACTIONS

A.1

An offsite circuit would be considered inoperable if it were not available to the required Class 1E bus(es). If two Class 1E AC electrical power distribution subsystems are required by LCO 3.8.10, and one Class 1E AC electrical power distribution subsystem has offsite power available, the remaining Class 1E AC electrical power distribution subsystem may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare required features inoperable, with no offsite power available, appropriate restrictions will be implemented in accordance with the affected required features LCO's ACTIONS.

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4

With the offsite circuit not available to all required AC electrical power distribution subsystems , the option would still exist to declare all required features inoperable. Since this option may involve undesired administrative efforts, the allowance for sufficiently conservative actions is made. With the required DG inoperable, the minimum required diversity of AC power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. ~~The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SDM is maintained.~~ Insert BASES 16

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

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

(continued)

INSERT BASES 16

that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes, including temperature increases when operating with a positive MTC, must also be evaluated to ensure they do not result in a loss of required SDM.

BASES

ACTIONS

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

example, see references 3 and 4. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions~~). The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained~~. Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the unit safety systems.

INSERT BASES 17

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

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

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

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of an SR. This note does not except the requirement for the battery to be capable of performing the particular function, just that the capability need not be demonstrated while that source of power is being relied on to meet the LCO.

REFERENCES

1. FSAR, Chapter 6.
2. FSAR, Chapter 15.
3. DCM S-67, "125V/250V Direct Current System, Section 4.3.1."
4. AR A0456369

INSERT BASES 17

that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes, including temperature increases when operating with a positive MTC, must also be evaluated to ensure they do not result in a loss of required SDM.

BASES (continued)

APPLICABILITY

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

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core;

b. Systems needed to mitigate a fuel handling accident are available;

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

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

ACTIONS

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

One or more Class 1E UPS inverters may be inoperable provided that the remaining OPERABLE inverters support the Class 1E 120 VAC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems - Shutdown," and are capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for positive reactivity additions. By the allowance of the option to declare required features inoperable with the associated Class 1E UPS inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions). ~~The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained~~.

INSERT BASES 1-8

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required Class 1E UPS inverters and to continue this action until restoration is accomplished in order to provide the necessary Class 1E UPS inverter power to the unit safety systems.

(continued)

INSERT BASES 18

that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes, including temperature increases when operating with a positive MTC, must also be evaluated to ensure they do not result in a loss of required SDM.

BASES (continued)

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required features may require redundant subsystems of electrical power distribution systems to be OPERABLE, one OPERABLE distribution subsystem may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystem LCO's Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions).

INSERT BASES 19

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC, DC, and 120 VAC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the unit safety systems.

Notwithstanding performance of the above conservative Required Actions, a required residual heat removal (RHR) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the RHR ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring RHR inoperable, which results in taking the appropriate RHR actions.

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

(continued)

INSERT BASES 19

that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes, including temperature increases when operating with a positive MTC, must also be evaluated to ensure they do not result in a loss of required SDM.

BASES (continued)

ACTIONS

A.1 and A.2

Continuation of CORE ALTERATIONS or positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the unit in compliance with the LCO. If the boron concentration of any coolant volume in the RCS, and when connected, the refueling canal or the refueling cavity is less than its limit, all operations involving CORE ALTERATIONS or positive reactivity additions must be suspended immediately.

Suspension of CORE ALTERATIONS and positive reactivity additions shall not preclude moving a component to a safe position. INSERT BASES 20

A.3

In addition to immediately suspending CORE ALTERATIONS ~~or~~ and positive reactivity additions, boration to restore the concentration must be initiated immediately.

In determining the required combination of boration flow rate and concentration, no unique Design Basis Event must be satisfied. The only requirement is to restore the boron concentration to its required value as soon as possible. In order to raise the boron concentration as soon as possible, the operator should begin boration with the best source available for unit conditions.

Once actions have been initiated, they must be continued until the boron concentration is restored. The restoration time depends on the amount of boron that must be injected to reach the required concentration.

SURVEILLANCE REQUIREMENTS

SR 3.9.1.1

This SR ensures that the coolant boron concentration in the filled portions of the RCS, the refueling canal, and the refueling cavity that have direct access to the reactor vessel is within the COLR limits. The boron concentration of the coolant in each required volume is determined periodically by chemical analysis.

A minimum Frequency of once every 72 hours is a reasonable amount of time to verify the boron concentration of representative samples. The Frequency is based on operating experience, which has shown 72 hours to be adequate.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 26.

2. FSAR, Chapter 15, Section 15.2.4

INSERT BASES 20

Operations that individually add limited positive reactivity (e.g., temperature fluctuations, 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.

BASES (continued)

LCO	This LCO requires that two source range neutron flux monitors be OPERABLE to ensure that redundant monitoring capability is available to detect changes in core reactivity. To be OPERABLE, each monitor must provide visual indication and at least one of the two monitors must provide an audible alarm and count rate indication in the Control Room. Therefore, with no audible alarm and count rate indication from at least one monitor, both monitors are inoperable until the audible indication is restored to the operable monitor – Action A must also be entered with no audible count rate indication in the control room.
APPLICABILITY	In MODE 6, the source range neutron flux monitors must be OPERABLE to determine changes in core reactivity. There are no other direct means available to check core reactivity levels. In MODES 2, 3, 4, and 5, these same installed source range detectors and circuitry are also required to be OPERABLE by LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation."
ACTIONS	A.1 and A.2 With only one source range neutron flux monitor OPERABLE, redundancy has been lost. Since these instruments are the only direct means of monitoring core reactivity conditions, CORE ALTERATIONS and ~~positive reactivity additions must be suspended immediately~~. The exception given in A.1 for the process of latching/unlatching control rods and friction testing of control rods is provided to allow completion of head installation prior to replacing a failed source range detector. RCCA latching and friction testing is conducted with the reactor vessel upper internals in place, thereby preventing the lowering of a temporary source range detector into the region of the core. This NOTE allows control rod movement with only one source range in place. Friction testing involves fully withdrawing and reinserting each rod in turn, which could change core reactivity by as much as one percent for the most reactive rod. The increase in count rate would be one to two counts per second. For Gamma Metrics, the increase in count rate would be 0.1 to 0.2 counts per second. The core coupling in this configuration would allow one source range detector to detect significant reactivity changes associated with control rod movement (Ref. 3). Performance of Required Action A.1 shall not preclude completion of movement of a component to a safe position or normal cooldown of a coolant volume for the purpose of system temperature control.

INSERT BASES 2.1

(continued)

INSERT BASES 21

introduction of coolant into the RCS with boron concentration less than required to meet the minimum boron concentration of LCO 3.9.1 must be suspended immediately. 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 required in the RCS for minimum refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation.

BASES

ACTIONS

B.1

With no source range neutron flux monitor OPERABLE including no OPERABLE audible alarm and count rate functions, action to restore a monitor to OPERABLE status shall be initiated immediately. Once initiated, action shall be continued until a source range neutron flux monitor including no OPERABLE audible alarm and count rate functions is restored to OPERABLE status.

B.2

INSERT BASES 22

With no source range neutron flux monitor OPERABLE, there are no direct means of detecting changes in core reactivity. However, since CORE ALTERATIONS and ~~positive reactivity additions~~ are not to be made, the core reactivity condition is stabilized until the source range neutron flux monitors are OPERABLE. This stabilized condition is determined by performing SR 3.9.1.1 to ensure that the required boron concentration exists.

The Completion Time of once per 12 hours ensures that unplanned changes in boron concentration would be identified. The 12 hour Frequency is reasonable, considering the low probability of a change in core reactivity during this time period.

SURVEILLANCE REQUIREMENTS

SR 3.9.3.1

SR 3.9.3.1 is the performance of a CHANNEL CHECK, which is a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that the two indication channels should be consistent with core conditions. Changes in fuel loading and core geometry can result in significant differences between source range channels, but each channel should be consistent with its local conditions. For core reload, the first CHANNEL CHECK for each channel may be performed using the first fuel assembly as a source, prior to unlatching it in the core.

The Frequency of 12 hours is consistent with the CHANNEL CHECK Frequency specified similarly for the same instruments in LCO 3.3.1.

SR 3.9.3.2

SR 3.9.3.2 is the performance of a CHANNEL CALIBRATION every 24 months. This SR is modified by a Note stating that neutron detectors are excluded from the CHANNEL CALIBRATION. The CHANNEL CALIBRATION for the normal N31 and N32 source range neutron flux monitors is described in B 3.3.1, "Reactor Trip System

(continued)

INSERT BASES 22

boron concentration changes inconsistent with Required Action A.2

BASES

LCO (continued)

b. Mixing of borated coolant to minimize the possibility of criticality; and

c. Indication of reactor coolant temperature.

An OPERABLE RHR loop includes an RHR pump, a heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path and to determine the low end temperature. The flow path starts in one of the RCS hot legs and is returned to the RCS cold legs.

The LCO is modified by a Note that allows the required operating RHR loop to be removed from service for up to 1 hour per 8 hour period, provided no operations are permitted that would ~~cause a reduction of the RCS boron concentration. Boron concentration reduction~~ is prohibited because uniform concentration distribution cannot be ensured without forced circulation. This permits operations such as valve testing, core mapping, or alterations in the vicinity of the reactor vessel hot leg nozzles. During this 1 hour period, decay heat is removed by natural convection to the large mass of water in the refueling cavity.

INSERT BASES 23

The LCO is also modified by a second Note that allows the required RHR Loop to be removed from service for up to 2 hours per 8 hour period to support surveillance leak rate testing of the RCS to RHR suction isolation valves, provided that no operations are permitted which might result in reduction of boron concentration. During this 2 hour period, decay heat is removed by natural convection to the large mass of water in the refueling cavity and the RCS.

APPLICABILITY

One RHR loop must be OPERABLE and in operation in MODE 6, with the water level $\geq$ 23 ft above the top of the reactor vessel flange, to provide decay heat removal. The 23 ft water level was selected because it corresponds to the 23 ft requirement established for fuel movement in LCO 3.9.7, "Refueling Cavity Water Level." Requirements for the RHR System in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS), and Section 3.5, Emergency Core Cooling Systems (ECCS). RHR loop requirements in MODE 6 with the water level < 23 ft are located in LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation-Low Water Level."

ACTIONS

RHR loop requirements are met by having one RHR loop OPERABLE and in operation, except as permitted in the Notes to the LCO.

(continued)

INSERT BASES 23

dilute the RCS boron concentration with coolant at boron concentrations less than required to meet the minimum boron concentration of LCO 3.9.1. Boron concentration reduction with coolant at boron concentrations less than required to assure the minimum required RCS boron concentration is maintained

BASES

ACTIONS (continued)

A.1

If RHR loop requirements are not met, there will be no forced circulation to provide mixing to establish uniform boron concentrations. ~~The suspension of any operation involving a reduction in reactor coolant boron concentration will reduce the likelihood of stratification of the boron concentration developing within the RCS.~~ INSERT BASES 24

A.2

If RHR loop requirements are not met, actions shall be taken immediately to suspend loading of irradiated fuel assemblies in the core. With no forced circulation cooling, decay heat removal from the core occurs by natural convection to the heat sink provided by the water above the core. A minimum refueling water level of 23 ft above the reactor vessel flange provides an adequate available heat sink. Suspending any operation that would increase decay heat load, such as loading an irradiated fuel assembly, is a prudent action under this condition.

A.3

If RHR loop requirements are not met, actions shall be initiated and continued in order to satisfy RHR loop requirements. With the unit in MODE 6 and the refueling water level $\geq$ 23 ft above the top of the reactor vessel flange, corrective actions shall be initiated immediately.

A.4

If RHR loop requirements are not met, all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere must be closed within 4 hours. With the RHR loop requirements not met, the potential exists for the coolant to boil and release radioactive gas to the containment atmosphere. Closing containment penetrations that are open to the outside atmosphere ensures dose limits are not exceeded.

The Completion Time of 4 hours is reasonable, based on the low probability of the coolant boiling in that time.

(continued)

INSERT BASES 24

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 required in the RCS for minimum refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation.

BASES

LCO (continued)

An OPERABLE RHR loop consists of an RHR pump, a heat exchanger, valves, piping, instruments and controls to ensure an OPERABLE flow path and to determine the low end temperature. The flow path starts in one of the RCS hot legs and is returned to the RCS cold legs. An operable RHR loop must be capable of being realigned to provide an operable flow path.

APPLICABILITY

Two RHR loops are required to be OPERABLE, and one RHR loop must be in operation in MODE 6, with the water level < 23 ft above the top of the reactor vessel flange, to provide decay heat removal. Requirements for the RHR System in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS), and Section 3.5, Emergency Core Cooling Systems (ECCS). RHR loop requirements in MODE 6 with the water level ≥ 23 ft are located in LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation-High Water Level." A Note is added to the applicability to assure that MODE 6 operation with water level < 23 ft. is not permitted unless two RHR loops are operable.

ACTIONS

A.1 and A.2

If less than the required number of RHR loops are OPERABLE, action shall be immediately initiated and continued until the RHR loop is restored to OPERABLE status and to operation or until ≥ 23 ft of water level is established above the reactor vessel flange. When the water level is ≥ 23 ft above the reactor vessel flange, the Applicability changes to that of LCO 3.9.5, and only one RHR loop is required to be OPERABLE and in operation. An immediate Completion Time is necessary for an operator to initiate corrective actions.

B.1

If no RHR loop is in operation, there will be no forced circulation to provide mixing to establish uniform boron concentrations. ~~The suspension of any operation involving a reduction in Reactor Coolant Boron Concentration will reduce the likelihood of boron stratifcation in the RCS.~~ Insert Bases 25

B.2

If no RHR loop is in operation, actions shall be initiated immediately, and continued, to restore one RHR loop to operation. Since the unit is in Conditions A and B concurrently, the restoration of two OPERABLE RHR loops and one operating RHR loop should be accomplished expeditiously.

(continued)

INSERT BASES 25

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 required in the RCS for minimum refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation.