AmerenUE
Callaway Plant

PO Box 620
Fulton, MO 65251

November 17, 2006

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop P1-137
Washington, DC 20555-0001

Ladies and Gentlemen: ULNRC-05345

DOCKET NUMBER 50-483
CALLAWAY PLANT
UNION ELECTRIC COMPANY
PROPOSED REVISION TO TECHNICAL SPECIFICATION 3.9.2
"UNBORATED WATER SOURCE ISOLATION VALVES" AND
ASSOCIATED REVISIONS TO TECHNICAL SPECIFICATION 3.3.9
"BORON DILUTION MITIGATION SYSTEM (BDMS)"
(LICENSE AMENDMENT REQUEST OL 1238)
Reference: ULNRC-05269, March 28, 2006

Pursuant to 10 CFR 50.90, AmerenUE, in the above referenced submittal letter requested an amendment to the Facility Operating License No. NPF-30 for Callaway Plant. As described in the referenced letter, the proposed revisions to Technical Specification (TS) 3.3.9, Boron Dilution Mitigation System (BDMS) and TS 3.9.2, Unborated Water Source Isolation Valves, removed specific valve numbers from the TS to the TS Bases; incorporated exception Notes on TS 3.3.9 Required Actions B.3.1, B.3.2, C.1, and C.2; and incorporated exception Notes on TS 3.9.2 LCO.

During the NRC review, several e-mails were transmitted and tele-conferences were held between AmerenUE personnel and NRC Staff to discuss the proposed license amendment request. In response, AmerenUE has revised the originally proposed TS and TS Bases markups for TS 3.3.9 and TS 3.9.2. The revisions incorporate NRC comments and resolutions from the discussions with the NRC Staff. Specifically, the proposed exception Notes to TS 3.3.9, Required Actions B.3.1, B.3.2, C.1, and C.2 are eliminated. The Notes would have allowed an exception for unborated water source isolation valves to be unisolated, under administrative controls, for certain plant activities conducted during MODES 2 (below P-6 interlock), 3, 4 and 5. These exceptions are deemed unacceptable during Modes greater than MODE 6.

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The exception Notes originally proposed for TS 3.9.2 LCO, would permit plant activities, performed under administrative controls, that are acceptable during MODE 6. However, the originally proposed Notes are now covered under a single generic exception Note to TS 3.9.2 LCO. The revised exception Note provides a generic statement that permits unborated water sources to be unsiolated under administrative controls for planned boron dilution evolutions.

The revised TS 3.3.9 and TS 3.9.2 and their Bases are included as attachments to this letter. Note that included in the TS Bases markups are the markups for TS 3.3.9 Condition A Bases and TS 3.3.1 Condition I and Condition K Bases as originally provided to the NRC for information.

As discussed above, essential information is provided in attachments to this letter. Attachment 1 provides NRC requests for additional information and the AmerenUE responses. Attachment 2 provides the revised TS markups. Attachment 3 provides the retyped TS pages. Attachment 4 provides the revised TS Bases pages marked-up to show the proposed Bases changes (for information only).

This letter revises identified actions committed to by AmerenUE in the submittal. Other statements in this letter are provided for information purposes and are not considered to be commitments. A summary of the regulatory commitments are provided in Attachment 5.

The Callaway Plant Review Committee and a subcommittee of the Nuclear Safety Review Board have reviewed and approved the attached revised TS and TS Bases markups. Note that these revisions result in an amendment request that has a more limited scope than originally proposed. As such, the original submittal evaluations continue to address these revisions and do not alter original evaluations that the amendment application involves no significant hazards consideration as determined per 10 CFR 50.92, and that pursuant to 10 CFR 51.22(b) no environmental assessment should be required to be prepared in connection with the issuance of this amendment.

In keeping with the original license amendment request, AmerenUE respectfully requests approval of the proposed license amendment by December 31, 2006. The approved amendment will be implemented within 90 days of approval.

Pursuant to 10 CFR 50.91(b)(1), AmerenUE is providing the State of Missouri with a copy of this letter and its attachments.

If you should have any questions on the above or attached, please contact Dave Shafer at (314) 554-3104.

Sincerely,

Executed on: November 16, 2006

Dave T. Fitzgerald
Manager, Regulatory Affairs

Attachments:
1) NRC Requests for Additional Information and AmerenUE Responses
2) Revised Markup of Technical Specification pages
3) Retyped Technical Specification pages
4) Revised Markup of Technical Specification Bases pages (For information only)
5) Summary of Regulatory Commitments

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ULNRC-05345

ATTACHMENT 1

NRC REQUESTS FOR ADDITIONAL INFORMATION AND AMERENUE RESPONSES

NRC REQUEST FOR ADDITIONAL INFORMATION TRANSMITTED VIA E-MAIL DATED JULY 10, 2006

In reviewing the AmerenUE application dated March 28, 2006 (ULNRC-05269), which proposes revisions to Technical Specifications 3.3.9 and 3.9.2 concerning boron dilution events, the staff has the following questions that were transmitted via e-mail dated July 10, 2006:

NRC Question 1:

The proposed amendment would remove reference to specific valve numbers in the Technical Specifications (TSs) 3.3.9 and 3.9.2, consistent with the Standard Technical Specifications (STS). However, the notes that are proposed to be added to TS 3.3.9 and TS 3.9.2 are not consistent with the STS. Provide a justification for including these notes in TSs 3.3.9 and 3.9.2, and an indication and example as to how these notes would be applied.

AmerenUE Response:

The responses have been revised to incorporate the resolutions from various discussions with NRC staff.

TS 3.9.2 Changes

As stated in Attachment 1, Section 2.0 of the submittal, the proposed revisions to TS 3.9.2, Unborated Water Source Isolation Valves, would remove references to specific Chemical and Volume Control system (CVCS) isolation valves, BGV0178 and BGV0601, and relocate them to the TS 3.9.2 Bases. This change is consistent with the Standard Technical Specifications, NUREG-1431. An additional plant specific change is proposed to provide an exception Note to the LCO requirement of TS 3.9.2. The Note would permit unborated water source isolation valves to be unisolated under administrative controls in MODE 6 for planned boron dilution evolutions. The exception is acceptable during MODE 6, based on plant operational needs and on the application of administrative controls to preclude an inadvertent boron dilution event.

The following examples are provided to demonstrate application of the exception Note.

Refueling decontamination activities provide an example when an exception to the LCO requirement to close and secure unborated water sources during MODE 6 would be needed. As a planned dilution evolution, refueling decontamination activities, would require unborated water source paths to be unisolated under administrative controls. Specifically, the administrative controls approved as part of Amendment 97 to the Callaway Plant Operating License are used to limit the volume of unborated water which can be added to the refueling pool for decontamination activities in order to prevent

diluting the refueling pool boron concentration below TS limits. These administrative controls are summarized in the Bases for TS 3.9.1, Boron Concentration, under APPLICABLE SAFETY ANALYSES. These administrative controls are also referenced in the TS 3.9.2 LCO Bases. Specifically in MODE 6, reactor makeup water is used to rinse items removed from the refueling pool and to spray down the refueling pool walls during the pool drain evolution to facilitate decontamination activities. The rinse and spray are done with unborated reactor makeup water supplied via temporary configurations (flexible hose connections to manual reactor makeup water isolation valves). During MODE 6, the exception Note permits these reactor makeup water isolation valves to be unsecured from the closed position, under the administrative controls; so that the above described decontamination activities may be performed.

Another example for application of the exception Note is operation of CVCS resin vessels in MODE 6. The CVCS resin vessels include the resin vessels of its subsystem the boron thermal regeneration system (BTRS). During MODE 6, the BTRS ion exchanger resin is routinely used for refueling chemistry control. When initially placed in service, this resin could remove a slight, pre-calculated, amount of boron from the RCS until it reaches equilibrium with the system. This resin equilibrium period is a planned boron dilution.

The above example is typical of an RCS cooldown to refueling conditions where resin is required to remove corrosion and activation products released from fuel and piping surfaces into the coolant. Removing these impurities is a key factor in Callaway's strategy to keep worker dose and skin contamination potential to ALARA levels during refueling activities. In exception to TS 3.9.2 LCO requirements and as permitted by the proposed exception Note, CVCS and BTRS vessels could be unisolated and operated during MODE 6, under administrative controls.

TS 3.3.9 Changes

As stated in Attachment 1, Section 2.0 of the submittal, the proposed revisions to TS 3.3.9, Boron Dilution Mitigation System, would remove references to specific CVCS isolation valves, BGV0178 and BGV0601, from Required Actions B.3.1, B.3.2, C.1 and C.2 and relocate them to the TS Bases. Specific isolation valves are not required in the Standard Technical Specifications, NUREG-1431, and relocating them to the appropriate TS Bases is an administrative only change and consistent with the Standard Technical Specifications.

The originally proposed exception Notes on TS 3.3.9 Required Actions B.3.1, B.3.2, C.1, and C.2 are eliminated.

NRC Question 2:

In the notes proposed to be added to TSs 3.3.9 and 3.9.2, there is repeated reference to chemical volume control system (CVCS) resin vessels or water source path valves being "intermittently" unisolated "under administrative controls." Address what administrative controls are being referred to in the notes, and provide a definition (i.e., the frequency) of "intermittently."

AmerenUE Response:

This response has been revised to incorporate the resolutions from various discussions with the NRC staff. The notes proposed to be added to TS 3.3.9 are eliminated because the exceptions permitted are not acceptable during modes of operation higher than MODE 6. The notes originally proposed to be added to TS 3.9.2 are now covered under one generic exception Note that permits unborated water sources to be unisolated under administrative controls for planned boron dilution evolutions. Administrative controls are summarized in the Bases for TS 3.9.1, Boron Concentration, under APPLICABLE SAFETY ANALYSES and also in the Bases for TS 3.9.2, Unborated Water Source Isolation Valves, under BACKGROUND.

NRC Question 3:

Discuss if the exceptions described in the notes to TS 3.3.9 and 3.9.2 would be used in lieu of limiting conditions for operation (LCOs) 3.3.9 and 3.9.2. Provide assurance that the TS surveillances and LCO required actions would continue to be taken when operating under administrative controls.

AmerenUE Response:

The responses have been revised to incorporate the resolutions from various discussions with the NRC staff.

TS 3.9.2 Changes

The exceptions described in the originally proposed Note 1 and proposed Note 2 for TS 3.9.2 LCO are now covered under one generic exception Note that permits unborated water sources to be unisolated under administrative controls for planned boron dilution evolutions. The exception modifies the current TS 3.9.2 LCO such that other administrative controls would be used in lieu of those required by TS 3.9.2 LCO. During

MODE 6 operations and under current TS 3.9.2 LCO, all unborated water source isolation valves that are connected to the RCS must be closed and secured to prevent an unplanned boron dilution in the reactor coolant. As stated in the Callaway FSAR, Section 15.4.6, "An uncontrolled boron dilution transient will not occur during this mode of operation. Inadvertent dilution ....is prevented by administrative controls which isolate the RCS from the potential source of unborated water." Plant administrative controls ensure that the requirements of the current Specification are met.

However, the proposed Note would permit plant activities to be performed with certain unborated water source isolation valves unisolated, when performed under administrative controls. In all cases, the administrative controls preclude the possibility of an inadvertent boron dilution event. At the completion of any planned boron dilution activity, prompt verification assures the unborated water source isolation valves are closed and secured. When not in use (as allowed by the proposed exception Note), unborated water source isolation valves are closed and secured. The TS 3.9.2 LCO required actions and surveillance requirements would continue to be taken.

TS 3.3.9 Changes

The originally proposed exception Notes for TS 3.3.9 Required Actions B.3.1, B.3.2, C.1, and C.2 are eliminated.

Callaway Plant Administrative Controls

As discussed above Callaway Plant administrative controls ensure the requirements of the Specifications are met, as well as, any approved exceptions. In all cases the administrative controls provide assurance that plant operations will not result in an inadvertent boron dilution event. This confidence is based on the robust nature of Callaway's administrative controls which include elements such as: (1) adherence to approved procedures; (2) planned evolutions and briefings; (3) calculations for the impact on boron concentrations prior to evolutions; (4) reviews by licensed operators; (5) valve identification with temporary tagging; and (6) prompt verification that unborated water source isolation valves are closed and secured after completion of any planned dilution activities.

NRC COMMENTS
(TRANSMITTED VIA E-MAIL ON SEPTEMBER 20, 2006)
AND AMERENUE RESPONSES

NRC Comment: It is my understanding they are going to withdraw the change to TS 3.3.9.

Response: Callaway will withdraw the proposed Note on proposed TS 3.3.9 Required Actions B.3.1, B.3.2, C.1, and C.2. However, proposed TS 3.3.9 Required Actions B.3.1, B.3.2, C.1, and C.2 have been revised to remove specific isolation valve numbers and relocate them to the TS 3.3.9 Bases and TS 3.9.2 Bases.

NRC Comment: The changes they are proposing for TS Bases 3.4.5, 3.4.6, 3.4.7, and 3.4.8 are adding detail.

Response: AmerenUE concurs that the proposed revisions to TS Bases 3.4.5, 3.4.6, 3.4.7, and 3.4.8 are adding necessary detail.

NRC Comment: The changes they are proposing to TS 3.9.2 and TS Bases 3.9.2 is where the meat of the LAR resides. For that I have a couple comments.

1) Insert 1 provides examples of "...planned boron management evolutions." The comment is that the only Mode 6 example is a boration not a dilution. There is no question about them being able to borate. They should include a dilution example to ensure everybody knows that is the intent. This TS Bases section only applies in Mode 6, all of the other Mode examples are excess verbiage. Boron dilution in any other Mode is controlled by the BDMS TS.

2) I am confused over the preconditioning of ion exchanger (IX) that are not intended for boron dilution. The last two sentences of the first paragraph of Insert 1A indicates these are going to be planned boron dilutions. The second paragraph of Insert 1A indicates that since they are preconditioned with an appropriate boron concentration they are not potential boron dilution sources. It was my understanding from the first phone call that, for the purposes of this TS, there were two types of IX, those to be used for an intentional boron dilution, i.e., the resin is specifically designed/intended to remove boron from the system, and all other IX uses. Any use of the use of the former would be a planned boron dilution any use of the latter would be preconditioned with an appropriate boron concentration from a source other than the RCS, thereby making them not boron dilution sources when placed in service.

3) There is no mention of a boron dilution by 'feed and bleed.' Is this intentional?

4) Insert 2B indicates they will use the LCO note to flush the gamma radiation detector, Insert 1A says they won't. This needs to be clarified.

5) They are inserting specific valve numbers into the TS Bases with Insert 2B, I can't comment on them without a P&ID. I don't need, or want, a P&ID to write a SER, but my wording would be more generic.

Responses: The following Callaway responses address each item of the NRC comment.

1) Note that INSERT 1 and INSERT 1A have been combined into INSERT 1. INSERT 1 is revised to include an example of a boron dilution evolution in Mode 6. See the attached markup and revision to INSERT 1.

2) Note that INSERT 1 and INSERT 1A have been combined into INSERT 1. Callaway has revised the language in INSERT 1 to eliminate examples that do not meet the definition of a planned boron dilution. See the attached markup and revision to INSERT 1. In addition, to clarify the NRC's understanding of the ion exchanger resins used at Callaway in Mode 6, the following is provided:

> For Mode 6 duty, an ion exchanger resin is routinely used for refueling chemistry control. When initially placed in service, this resin could remove a slight, pre-calculated, amount of boron from the RCS until it reaches equilibrium with the system. This resin equilibrium period is an example of a planned dilution event for Mode 6.
>
> Callaway does not use ion exchanger resin that only functions to remove boron from the reactor coolant system in Mode 6. However, Callaway has this type of resin in a standby status (and connected to the system) for use in other Modes. During Mode 6, to prevent an inadvertent dilution from system leakage through this resin, Callaway isolates and locks the valves on the vessels holding the resin in standby.

3) Callaway intentionally does not mention boron dilution by 'feed and bleed'. Diluting the reactor coolant system in Mode 6 with unborated water, using a 'feed and bleed' method, is not performed at Callaway. It is Callaway's intention to not include feed and bleed as a planned dilution option for Mode 6.

4) As discussed in response to item (2), INSERT 1A has been combined into INSERT 1 and INSERT 1 is revised. The revised INSERT 1 includes clarification that in Mode 6, the maintenance activity of flushing the gamma radiation detector would be performed as a planned dilution using administrative controls. INSERT 2, INSERT 2A, and INSERT 2B have been combined into INSERT 2. INSERT 2 has been revised to be consistent with INSERT 1. See the attached markup and revision to INSERT 2.

5) For clarity, Callaway prefers to include specific equipment descriptions in the TS Bases.

B 3.9 REFUELING OPERATIONS

B 3.9.2 Unborated Water Source Isolation Valves

TSBCN 02-016

BASES

BACKGROUND

INSERT 1

During MODE 6 operations, all isolation valves for reactor makeup water sources containing unborated water that are connected to the Reactor Coolant System (RCS) must be closed to prevent unplanned boron dilution of the reactor coolant. The isolation valves (BGV0178 and BGV0601) must be secured in the closed position.

Administrative controls will limit the volume of unborated water that can be added to the refueling pool for decontamination activities in order to prevent diluting the refueling pool and RCS below the specified limits (Ref. 3). (See Bases for Specification 3.9.1.)

APPLICABLE SAFETY ANALYSES

The possibility of an inadvertent boron dilution event (Ref. 1) occurring during MODE 6 refueling operations is precluded by adherence to this LCO, which requires that potential dilution sources be isolated. Closing the required valves during refueling operations prevents the flow of unborated water to the filled portion of the RCS. The valves are used to isolate unborated water sources. These valves have the potential to indirectly allow dilution of the RCS boron concentration in MODE 6. By isolating unborated water sources, a safety analysis for an uncontrolled boron dilution accident in accordance with the Standard Review Plan (Ref. 2) is not required for MODE 6.

all

that are connected to the RCS.

The RCS boron concentration satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

INSERT 2

This LCO requires that flow paths via BGV0178 and BGV0601 to the RCS from unborated water sources be isolated to prevent unplanned boron dilution during MODE 6 and thus avoid a reduction in SDM.

APPLICABILITY

In MODE 6, this LCO is applicable to prevent an inadvertent boron dilution event by ensuring isolation of all sources of unborated water to the RCS.

For all other MODES, the boron dilution accident was analyzed and was found to be capable of being mitigated.

(continued)

TSB CN 02-016

INSERT 1
Bases 3.9.2

During MODE 6 operations, all unborated water source isolation valves that are connected to the Reactor Coolant System (RCS) must be closed to prevent unplanned boron dilution of the reactor coolant. The isolation valves must be secured in the closed position.

Boron dilution in Mode 6 could occur from reactor makeup water sources containing unborated water or boron dilution could also occur from ion exchange resin contained within the CVCS and BTRS for water chemistry control. Note that CVCS resin vessels include the resin vessels of its subsystem the BTRS. While the purpose of the resin is to control water impurity levels and clarity, it may remove a slight amount of boron from the system's water stream when the resin is initially placed in service. The purified water stream is returned to the RCS at a slightly lower boron concentration until the resin reaches chemical equilibrium and is no longer a dilution source. Operations involving the conditioning and management of resin are permitted in Mode 6 because the amount of global RCS boron removed from the RCS during the equilibrium period can be calculated beforehand. As such, these operations are conducted as planned dilutions using administrative controls.

In Mode 6, operation of the CVCS letdown gamma radiation detector SJRE001 is not required. However, flushing the detector with unborated water for maintenance during Mode 6 would be performed as a planned dilution using administrative controls.

Some unborated water sources, that are not connected to the RCS in their as-built configuration, can be temporarily configured (ex. flexible hose connected) to provide a direct path for unborated water into the RCS. A routine Mode 6 activity requiring this temporary configuration is decontamination of the refueling pool. However, administrative controls will limit the volume of unborated water that can be added to the refueling pool for decontamination or planned dilution activities, in order to prevent diluting the refueling pool and RCS below the specified limits (Ref. 3). (See the Bases for LCO 3.9.1, "Boron Concentration".

Callaway reactivity management provides systematic direction to control activities that impact plant reactivity. This means precluding unplanned or uncontrolled occurrences impacting reactivity (positive or negative), including inadvertent boron dilution events.

Plant operations may require planned boron management evolutions. Reactivity management provides provisions that any planned activities and evolutions with the potential to impact reactivity are identified; are conducted in a controlled manner; are evaluated to ensure the effects of reactivity changes are known and monitored; and are performed by plant personnel briefed so that any anomalous indications are met with

TSB CN 02-016

INSERT 1 continued
Bases 3.9.2

conservative action. Specifically, administrative controls include: (1) adherence to approved procedures; (2) planned evolutions and briefings; (3) calculations for the impact on boron concentrations prior to evolutions; (4) reviews by licensed operators; (5) valve identification with temporary tagging; and (6) prompt verification that unborated water source isolation valves are closed and secured after completion of any planned dilution activities.

TSB CN 02-016

INSERT 2
Bases 3.9.2

This LCO requires that unborated water source flow paths connected to the RCS be isolated to prevent unplanned boron dilution during MODE 6 and thus avoid a reduction in SDM. The unborated water source isolation valves must be closed and secured. Isolation valves connected to the RCS include: (1) unborated reactor makeup water (BGV0178 and BGV0601), (2) CVCS resin vessels configured with resin for dilution during normal operation (BG8522A, BG8522B, BGV0039, BGV0043, BGV0051, and BGV0055) and (3) unborated flushing water for the CVCS letdown radiation monitor (SJV0703).

Some unborated water sources, that are not connected to the RCS in their as-built configuration, can be temporarily configured (ex. flexible hose connected) to provide a direct path for unborated water into the RCS. Isolation valves not connected to the RCS, but modified via temporary configuration to provide a direct path for unborated water into the RCS include: (1) BLV0078, (2) BLV0079 and (3) BLV0055.

This LCO is modified by a NOTE to allow unborated water sources to be unisolated under administrative controls for planned boron dilution evolutions. The NOTE also permits unborated water sources, not connected to the RCS in their as-built configuration, but temporarily configured (ex. flexible hose connected) to provide a direct path for unborated water into the RCS, to be used under administrative controls for planned boron dilution evolutions.

During refueling activities, it may be necessary for an unborated water source to be unisolated. Based on License Amendment 97, administrative controls are used to limit the volume of unborated water which can be added to the refueling pool for decontamination activities in order to prevent diluting the refueling pool boron concentration below TS limits. The administrative controls in this case are identified in TS Bases 3.9.1 and are applicable to the LCO NOTE exception for the following specific isolation valves: BLV0078, BLV0079 and BLV0055.

In Mode 6, other plant activities may require unborated water sources to be unisolated under administrative controls for planned boron dilution evolutions. The LCO NOTE allows an isolation exception for use of the reactor makeup water system, for operation of CVCS resin vessels, and for maintenance to flush the CVCS letdown gamma radiation detector SJRE001 with unborated reactor makeup water. The administrative controls include plant reactivity management requirements and operational awareness and are described in the TS Bases 3.9.2 Background. These requirements are applicable to the LCO NOTE exception for the following specific isolation valves: BGV0178, BGV0601, BG8522A, BG8522B, BGV0039, BGV0043, BGV0051, BGV0055 and SJV0703.

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ATTACHMENT 2

MARKUP OF TECHNICAL SPECIFICATION PAGES

For Information Only

3.3 INSTRUMENTATION

3.3.9 Boron Dilution Mitigation System (BDMS)

LCO 3.3.9 Two trains of the BDMS shall be OPERABLE and one RCS loop shall be in operation.

APPLICABILITY: MODES 2 (below P-6 (Intermediate Range Neutron Flux) interlock), 3, 4, and 5.

---------- NOTE ----------
The boron dilution flux multiplication signal may be blocked in MODES 2 (below P-6 (Intermediate Range Neutron Flux) interlock) and 3 during reactor startup.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One train inoperable.	A.1	Restore train to OPERABLE status.	72 hours
B. Two trains inoperable. OR Required Action and associated Completion Time of Condition A not met.	B.1	---------- NOTE ---------- Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SDM. ---------- Suspend operations involving positive reactivity additions.	Immediately
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.2	Perform SR 3.1.1.1.	1 hour AND Once per 12 hours thereafter
	AND		
	B.3.1	Close and secure unborated water source isolation valves ~~BGV0178 and BGV0601~~.	4 hours
	AND		
	B.3.2	Verify unborated water source isolation valves ~~BGV0178 and BGV0601~~ are closed and secured.	Once per 31 days
C. No RCS loop in operation.	C.1	Close and secure unborated water source isolation valves ~~BGV0178 and BGV0601~~.	4 hours
	AND		
	C.2	Verify unborated water source isolation valves ~~BGV0178 and BGV0601~~ are closed and secured.	Once per 31 days

OL-1238

3.9 REFUELING OPERATIONS

3.9.2 Unborated Water Source Isolation Valves

LCO 3.9.2 Each valve used to isolate unborated water sources ~~BGV0178 and BGV0601,~~ shall be secured in the closed position.

INSERT LCO 3.9.2

APPLICABILITY: MODE 6.

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ACTIONS

NOTE
Separate Condition entry is allowed for each unborated water source isolation valve.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. NOTE Required Action A.3 must be completed whenever Condition A is entered.	A.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
One or more valves not secured in closed position.	A.2	Initiate actions to secure valve in closed position.	Immediately
	AND		
	A.3	Perform SR 3.9.1.1.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.2.1	Verify each valve that isolates unborated water sources ~~BGV0178 and BGV0601~~ is secured in the closed position.	31 days

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INSERT LCO 3.9.2

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

- Unborated water sources may be unisolated under administrative controls for planned boron dilution evolutions.

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ATTACHMENT 3

RETYPED TECHNICAL SPECIFICATION PAGES

(To Be Provided Later)

ULNRC- 05345

ATTACHMENT 4

PROPOSED TECHNICAL SPECIFICATION BASES CHANGES

(for information only)

BASES

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY (continued)

5. Source Range Neutron Flux

The LCO requirement for the Source Range Neutron Flux trip Function ensures that protection is provided against an uncontrolled RCCA bank rod withdrawal accident from a subcritical condition during startup (automatic rod withdrawal is no longer available). This trip Function provides redundant protection to the Power Range Neutron Flux- Low and Intermediate Range Neutron Flux trip Functions. In MODES 3, 4, and 5, administrative controls also prevent the uncontrolled manual withdrawal of rods. The NIS source range detectors are located external to the reactor vessel and measure neutrons leaking from the core. The NIS source range detectors do not provide any inputs to control systems. The source range trip is the only RTS automatic protection function required in MODES 3, 4, and 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted. Therefore, the functional capability at the Trip Setpoint is assumed to be available.

The LCO requires two channels of Source Range Neutron Flux to be OPERABLE. Two OPERABLE channels are sufficient to ensure no single random failure will disable this trip Function. This Function uses one-out-of-two trip logic. The Trip Setpoint is ≤ 1.0 E5 cps. The outputs of the Function to RTS logic are not required OPERABLE in MODE 6 or when all rods are fully inserted and the Rod Control System is incapable of rod withdrawal.

uncontrolled

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The Source Range Neutron Flux trip Function provides protection for control rod withdrawal from subcritical boron dilution and control rod ejection events.

INSERT 1
B 3.3.1

In MODE 2 when below the P-6 setpoint, the Source Range Neutron Flux trip must be OPERABLE. Above the P-6 setpoint, the Intermediate Range Neutron Flux trip and the Power Range Neutron Flux-Low trip will provide core protection for reactivity accidents. Above the P-6 setpoint, the NIS source range neutron flux reactor trip may be manually blocked. When the source range trip is blocked, the high voltage to the detectors is also removed.

In MODES 3, 4, and 5 with the Rod Control System capable of rod withdrawal or one or more rods not fully inserted, the Source Range Neutron Flux trip Function must also be OPERABLE. If the Rod Control System is capable of rod withdrawal, the Source Range Neutron Flux trip must be OPERABLE to provide core protection against a rod withdrawal accident. If the Rod Control

(continued)

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INSERT1
B 3.3.1

In MODE 2, credit is also taken for a reactor trip being initiated by this trip function to alert the control room operators to manually mitigate an inadvertent boron dilution event.

BASES

ACTIONS

G.1 and G.2 (continued)

range channels or the neutron flux channels discussed in LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," with action to reduce power below the count rate equivalent to the P-6 setpoint.

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.

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.

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. 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.

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INSERT 2
B 3.3.1

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, the requirements of LCOs 3.1.5, 3.1.6, and 3.4.2 are met, and the initial and critical boron concentration assumptions in FSAR Section 15.4.6 (Ref. 16) are satisfied. ~~Introduction of reactor makeup water into the RCS from the~~

(continued)

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INSERT2
B 3.3.1

See LCO 3.3.9, "Boron Dilution Mitigation System," for requirements related to the mitigation of inadvertent boron dilution events.

BASES

ACTIONS

I.1 (continued)

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Chemical and Volume Control System mixing tee is not permitted when one source range neutron flux channel is inoperable.

J.1

Condition J applies to two inoperable Source Range Neutron Flux trip channels when in MODE 2 below the P-6 setpoint 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 Reactor Trip Breakers (RTBs) must be opened immediately. With the RTBs open, the core is in a more stable condition.

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 monitoring and protection functions. With one of the source range channels inoperable, 48 hours is allowed to restore it to an OPERABLE status. If the channel cannot be returned to an OPERABLE status, action must be initiated within the same 48 hours to fully insert all rods. One 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 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 reasonable considering the other source range channel remains OPERABLE to perform the safety function and given the low probability of an event occurring during this interval. 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 permitted provided the SDM limits specified in the COLR are met and the initial and critical boron concentration assumptions in FSAR Section 15.4.6 (Ref. 16) are satisfied. Introduction of reactor makeup water into the RCS from the Chemical and Volume Control System mixing tee is not permitted when one source range neutron flux channel is inoperable.

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INSERT 2
B 3.3.1

(continued)

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INSERT2
B 3.3.1

See LCO 3.3.9, "Boron Dilution Mitigation System," for requirements related to the mitigation of inadvertent boron dilution events.

B 3.3 INSTRUMENTATION

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B 3.3.9 Boron Dilution Mitigation System (BDMS)

INSERT 1a
Base 3.3.9

BASES

BACKGROUND

The primary purpose of the BDMS is to mitigate the consequences of the inadvertent addition of unborated primary grade water into the Reactor Coolant System (RCS) when the plant is in MODES 2 (below P-6 setpoint), 3, 4, and 5.

The BDMS utilizes two channels of source range instrumentation. Each source range channel provides a signal to its microprocessor, which continuously records the counts per minute. At the end of each discrete one-minute interval, an algorithm compares the average counts per minute value (flux rate) of that 1 minute interval with the average counts per minute value for the previous nine, 1 minute intervals. If the flux rate during a 1 minute interval is greater than or equal to 1.7 times the flux rate during any of the prior nine 1 minute intervals, the BDMS provides a signal to initiate mitigating actions.

Upon detection of a flux multiplication by either source range instrumentation train, an alarm is sounded to alert the operator and valve movement is automatically initiated to terminate the dilution and start boration. Valves that isolate the refueling water storage tank (RWST) are opened to supply borated water to the suction of the centrifugal charging pumps, and valves which isolate the Volume Control Tank are closed to terminate the dilution.

APPLICABLE SAFETY ANALYSES

The BDMS senses abnormal increases in source range counts per minute (flux rate) and actuates VCT and RWST valves to mitigate the consequences of an inadvertent boron dilution event as described in Reference 1. The accident analyses rely on automatic BDMS actuation to mitigate the consequences of inadvertent boron dilution events in MODES 3, 4, and 5. The MODE 2 analysis in Reference 1 credits the source range reactor trip function, in conjunction with operator action. The operation of one RCS loop in ~~MODES 2 (below P-6~~ setpoint), 3, 4, and 5 provides adequate flow to ensure mixing, prevent stratification, and produce gradual reactivity changes during RCS boron concentration reductions. The reactivity change rate associated with boron reduction will, therefore, be within the transient mitigation capability of the BDMS. With no reactor coolant loop in operation in the above MODES, boron dilutions must be terminated and dilution sources isolated. The boron dilution analysis in these MODES takes credit for the mixing volume associated with having at least one reactor coolant loop in operation.

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all

(see Condition C).

(continued)

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INSERT 1a
Bases 3.3.9

The addition of unborated primary grade water into the RCS results in boron dilution and a potential for an inadvertent boron dilution event. Other potential boron dilution sources have been identified. An inadvertent boron dilution path is created when flushing the Chemical and Volume Control system (CVCS) letdown gamma radiation detector, SJRE001, with unborated reactor makeup water. Boron dilution may also be accomplished by removing boron from the CVCS stream prior to RCS return using the ion exchange capability of the CVCS resin vessels. The CVCS resin vessels include the resin vessels of its subsystem, the boron thermal regeneration system.

As described in TS 3.9.2 Bases, plant reactivity management requirements preclude inadvertent boron dilution events, while permitting planned boron dilution evolutions (necessary for plant operations) performed under administrative controls.

BASES

APPLICABILITY (continued)

In MODE 6, ~~a~~ an inadvertent dilution event is precluded by locked valves (~~BGV0178 and~~ BGV0601) that isolate the RCS from the potential ~~source~~ sources of unborated water (according to LCO 3.9.2, "Unborated Water Source Isolation Valves").

INSERT 1
Bases 3.3.9

The Applicability is modified by a Note that allows the boron dilution flux multiplication signal to be blocked during reactor startup in MODE 2 (below P-6 setpoint) and MODE 3. Blocking the flux multiplication signal is acceptable during startup provided the reactor trip breakers are closed with the intent to commence the withdrawal of control banks for startup. This Applicability Note can not be used to block BDMS prior to or during shutdown bank withdrawal. The P-6 interlock provides a backup block signal to the source range flux multiplication circuit.

ACTIONS

The most common cause of channel inoperability is outright failure or drift of the bistable or process module sufficient to exceed the tolerance allowed by the unit specific calibration procedure. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. This determination of setpoint drift is generally made during the performance of a COT when the process instrumentation is set up for adjustment to bring it to within specification. If the Trip Setpoint is less conservative than the tolerance specified by the calibration procedure, the channel must be declared inoperable immediately and the appropriate Condition entered.

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A.1

With one train of the BDMS inoperable, Required Action A.1 requires that the inoperable train must be restored to OPERABLE status within 72 hours. In this Condition, the remaining BDMS train is adequate to provide protection. The 72 hour Completion Time is based on the BDMS Function and is consistent with Engineered Safety Feature ~~Actuation System~~ Completion Times for loss of one redundant train. Also, the remaining OPERABLE train provides continuous indication of core power status to the operator, has an alarm function, and sends a signal to both trains of the BDMS to assure system actuation.

Administrative controls require operator awareness during all reactivity manipulations. These administrative controls include:

- Reactivity management briefs of the Control Room Operations Staff (typically conducted at the beginning of each shift);

(continued)

TSB CN 02-016

INSERT1
Bases 3.3.9

for unborated reactor makeup water (BGV0178 and BGV0601), CVCS resin vessels configured with resin for dilution during normal operation (BG8522A, BG8522B, BGV0039, BGV0043, BGV0051, and BGV0055), and the purge line used during flushing of CVCS letdown radiation monitor (SJV0703)

BASES

ACTIONS

A.1 (continued)

- Use of self-verification techniques by all licensed operators performing core reactivity manipulations;
- Peer checks for all reactivity manipulations during routine operations and for all positive reactivity additions during transient or off-normal operations;
- Off-normal procedures are available that address reactor makeup control system (RMCS) malfunctions and potential loss of shutdown margin (SDM).

During ~~any and all~~ rod motion, operators monitor all available indications of nuclear power. During RCS boron concentration change evolutions, operators observe the various indications and alarms provided in the RMCS design for monitoring proper system operation as discussed in FSAR Section 15.4.6 (Reference 1). Introduction of reactor makeup water into the RCS from the Chemical and Volume Control System mixing tee is not permitted when one BDMS train is inoperable.

B.1, B.2, B.3.1, and B.3.2

With two trains inoperable, or the Required Action and associated Completion Time of Condition A not met, the initial action (Required Action B.1) is to suspend all operations involving positive reactivity additions immediately. This includes withdrawal of control or shutdown rods and intentional boron dilution.

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Required Action B.2 verifies the SDM according to SR 3.1.1.1 within 1 hour and once per 12 hours thereafter. This action is intended to confirm that no unintended boron dilution has occurred while the BDMS was inoperable, and that the required SDM has been maintained. The specified Completion Time takes into consideration sufficient time for the initial determination of SDM and other information available in the control room related to SDM.

"Unborated Water Source Isolation Valves"

closed and

the LCO Bases for

Required Action B.3.1 requires valves listed in LCO 3.9.2 ~~(Required Action A.2), BGV0178 and BGV0601~~ to be secured to prevent the flow of unborated water into the RCS. Once it is recognized that two trains of the BDMS are inoperable, the operators will be aware of the possibility of a boron dilution, and the 4 hour Completion Time is adequate to complete the requirements of LCO 3.9.2. The recurring 31 day verification of Required Action B.3.2 ensures these valves remain closed for an extended Condition B entry.

INSERT 16
Bases 3.3.9

(continued)

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INSERT 1b
Bases 3.3.9

An inadvertent dilution event is precluded by locked valves for unborated reactor makeup water (BGV0178 and BGV0601), CVCS resin vessels configured with resin for dilution during normal operation (BG8522A, BG8522B, BGV0039, BGV0043, BGV0051, and BGV0055), and the purge line used during flushing of CVCS letdown radiation monitor (SJV0703) that isolate the RCS from potential sources of unborated water.

BASES

ACTIONS

B.1, B.2, B.3.1, and B.3.2 (continued)

Required Action B.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 a positive MTC exists, must be evaluated to ensure they do not result in a loss of required SDM.

C.1 and C.2 TSBCN 02-016

INSERT 1b Bases 3.3.9

Condition C is entered with no RCS loop in operation. The operation of one RCS loop provides adequate flow to ensure mixing, prevent stratification, and produce gradual reactivity changes during RCS boron concentration reductions. The reactivity change rate associated with boron reduction will, therefore, be within the transient mitigation capability of the Boron Dilution Mitigation System (BDMS). With no reactor coolant loop in operation, all dilution sources must be isolated. The boron dilution analysis takes credit for the mixing volume associated with having at least one reactor coolant loop in operation.

listed in the LCO Bases for LCO 3.9.2, "Unborated Water Source Isolation Valves"

Required Action C.1 requires that valves ~~BGV0178 and BGV0684~~ be closed and secured to prevent the flow of unborated water into the RCS. The 4 hour Completion Time is adequate to perform these local valve manipulations. The recurring 31 day verification of Required Action C.2 ensures these valves remain closed and secured for an extended Condition C entry.

SURVEILLANCE REQUIREMENTS

The BDMS trains are subject to a CHANNEL CHECK, valve closure in MODE 5, COT, CHANNEL CALIBRATION, and Response Time Testing. In addition, the requirement to verify one RCS loop in operation is subject to periodic surveillance.

SR 3.3.9.1

Performance of the CHANNEL CHECK once every 12 hours ensures that gross failure of source range instrumentation has not occurred.

A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to

(continued)

TSB CN 02-016

INSERT 1b
Bases 3.3.9

An inadvertent dilution event is precluded by locked valves for unborated reactor makeup water (BGV0178 and BGV0601), CVCS resin vessels configured with resin for dilution during normal operation (BG8522A, BG8522B, BGV0039, BGV0043, BGV0051, and BGV0055), and the purge line used during flushing of CVCS letdown radiation monitor (SJV0703) that isolate the RCS from potential sources of unborated water.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.9.1 (continued)

verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

The Frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

SR 3.3.9.2

SR 3.3.9.2 requires that valve BGV0178 be secured and closed prior to entry into MODE 5. Specification 3.9.2 requires that this valve also be secured and closed in MODE 6. Closing BGV0178 satisfies the boron dilution accident analysis assumption that flow orifice BGFO0010 limits the dilution flow rate to no more than 150 gpm in MODE 5. This Surveillance demonstrates that the valve is closed through a system walkdown. SR 3.3.9.2 is modified by a Note stating that it is only required to be performed in MODE 5. This Note requires that the surveillance be performed prior to entry into MODE 5 and every 31 days while in MODE 5. The 31 day frequency is based on engineering judgment and is considered reasonable in view of other administrative controls that will ensure that the valve opening is an unlikely possibility.

SR 3.3.9.3

SR 3.3.9.3 requires the performance of a COT every 184 days, to ensure that each train of the BDMS and associated trip setpoints are fully operational. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. This test shall include verification that the boron dilution flux multiplication setpoint is equal to or less than an increase of 1.7 times the count rate within a 10 minute

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

changes during RCS boron concentration reductions. The reactivity change rate associated with boron reduction will, therefore, be within the transient mitigation capability of the Boron Dilution Mitigation System (BDMS). With no reactor coolant loop in operation in either MODES 3, 4, or 5, boron dilutions must be terminated and dilution sources isolated. The boron dilution analysis in these MODES takes credit for the mixing volume associated with having at least one reactor coolant loop in operation. LCO 3.3.9, "Boron Dilution Mitigation System (BDMS)," contains the requirements for the BDMS.

all

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Failure to provide decay heat removal may result in challenges to a fission product barrier. The RCS loops are part of the primary success path that functions or actuates to prevent or mitigate a Design Basis Accident or transient that either assumes the failure of, or presents a challenge to, the integrity of a fission product barrier.

RCS Loops - MODE 3 satisfy Criterion 3 of 10CFR50.36(c)(2)(ii).

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.

(continued)

BASES

LCO (continued)

Utilization of the Note 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 with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1, thereby maintaining the margin to criticality. Introduction of reactor makeup water into the RCS from the Chemical and Volume Control System mixing tee is not permitted when no RCS loop is in operation. Boron dilution with coolant at boron concentrations less than required to assure the SDM is maintained is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation; and

INSERT A

INSERT A1

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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, 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.

APPLICABILITY

In MODE 3, this LCO ensures forced circulation of the reactor coolant to remove decay heat from the core and to provide proper boron mixing. The most stringent condition of the LCO, that is, two RCS loops OPERABLE and two RCS loops in operation, applies to MODE 3 with the Rod Control System capable of rod withdrawal. The least stringent condition, that is, two RCS loops OPERABLE and one RCS loop in operation, applies to MODE 3 with the Rod Control System not capable of rod withdrawal.

Operation in other MODES is covered by:

LCO 3.4.4, "RCS Loops - MODES 1 and 2";
LCO 3.4.6, "RCS Loops - MODE 4";
LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled";
LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled";
LCO 3.9.5, "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).

(continued)

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INSERT A

, operation of CVCS resin vessels configured with resin for dilution during normal operation is not permitted, and operation of the purge line associated with flushing the CVCS letdown radiation monitor is not permitted

INSERT A1

Note that CVCS resin vessels include the resin vessels of its subsystem the BTRS.

BASES

ACTIONS

D.1, D.2, and D.3 (continued)

sets). All operations involving introduction of coolant, into the RCS, with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 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 defeating the Rod Control System removes the possibility of an inadvertent rod withdrawal. 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. Introduction of reactor makeup water into the RCS from the Chemical and Volume Control System mixing tee is not permitted when no RCS loop is in operation, consistent with Required Action C.1 of LCO 3.3.9, "Boron Dilution Mitigation System (BDMS)." The immediate Completion Time reflects the importance of maintaining operation for heat removal. The action to restore must be continued until one loop is restored to OPERABLE status and operation.

INSERT A

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SURVEILLANCE REQUIREMENTS

SR 3.4.5.1

This SR requires verification every 12 hours that the required loops are in operation. Verification 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 ≥ 7% for required RCS loops. If the SG secondary side narrow range water level is < 7%, 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)

TSB CN 02-016

INSERT A

, operation of CVCS resin vessels configured with resin for dilution during normal operation is not permitted, and operation of the purge line associated with flushing the CVCS letdown radiation monitor is not permitted

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.6 RCS Loops - MODE 4

BASES

BACKGROUND

In MODE 4, the primary function of the reactor coolant is the removal of decay heat and the transfer of this heat to either the steam generator (SG) secondary side coolant or the component cooling water via the residual heat removal (RHR) heat exchangers. The secondary function of the reactor coolant is to act as a carrier for soluble neutron poison, boric acid.

The reactor coolant is circulated through four RCS loops connected in parallel to the reactor vessel, each loop containing an SG, a reactor coolant pump (RCP), and appropriate flow, pressure, level, and temperature instrumentation for control, protection, and indication. The RCPs circulate the coolant through the reactor vessel and SGs at a sufficient rate to ensure proper heat transfer and to prevent boric acid stratification.

In MODE 4, either RCPs or RHR loops can be used to provide forced circulation. The intent of this LCO is to provide forced flow from at least one RCP or one RHR loop for decay heat removal and transport. The flow provided by one RCP loop or RHR loop is adequate for decay heat removal. The other intent of this LCO is to require that two paths be available to provide redundancy for decay heat removal.

APPLICABLE SAFETY ANALYSES

In MODE 4, RCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event.

The operation of one RCP in MODES 3, 4, and 5 provides adequate flow to ensure mixing, prevent stratification, and produce gradual reactivity changes during RCS boron concentration reductions. The reactivity change rate associated with boron reduction will, therefore, be within the transient mitigation capability of the Boron Dilution Mitigation System (BDMS). With no reactor coolant loop in operation in either MODES 3, 4, or 5, boron dilutions must be terminated and dilution sources isolated. The boron dilution analysis in these MODES takes credit for the mixing volume associated with having at least one reactor coolant loop in operation. LCO 3.3.9, "Boron Dilution Mitigation System (BDMS)," contains the requirements for the BDMS.

RCS Loops -MODE 4 satisfies Criterion 4 of 10CFR50.36(c)(2)(ii).

(continued)

all

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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. The 1 hour time period is adequate to perform the necessary testing, 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 with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1, thereby maintaining the margin to criticality. Introduction of reactor makeup water into the RCS from the Chemical and Volume Control System mixing tee is not permitted when no RCS loop is in operation. Boron dilution with coolant at boron concentrations less than required to assure the SDM is maintained is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation; and

INSERT A

INSERT A1

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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 ≤ 275°F. This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started.

An OPERABLE RCS loop is comprised of an OPERABLE RCP and an OPERABLE SG, which has the minimum water level specified in SR 3.4.6.2.

(continued)

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INSERT A

, operation of CVCS resin vessels configured with resin for dilution during normal operation is not permitted, and operation of the purge line associated with flushing the CVCS letdown radiation monitor is not permitted

INSERT A1

Note that CVCS resin vessels include the resin vessels of its subsystem the BTRS.

BASES

ACTIONS (continued)

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 introduction of coolant, into the RCS, with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended and action to restore one RCS or RHR loop to OPERABLE status and operation must be initiated. Boron dilution requires forced circulation from at least one RCP for proper mixing so that inadvertent criticality can be prevented. 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. Introduction of reactor makeup water into the RCS from the Chemical and Volume Control System mixing tee is not permitted when no RCS loop is in operation, consistent with Required Action C.1 of LCO 3.3.9, "Boron Dilution Mitigation System (BDMS)." 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.

INSERT A

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SURVEILLANCE REQUIREMENTS

SR 3.4.6.1

This SR requires verification every 12 hours that one RCS or RHR loop is in operation. Verification 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 $\geq$ 7% for required RCS loops. If the SG secondary side narrow range water level is < 7%, the tubes may become uncovered and the associated loop may not be capable of providing the heat sink necessary for removal of decay heat. 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.

(continued)

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INSERT A

, operation of CVCS resin vessels configured with resin for dilution during normal operation is not permitted, and operation of the purge line associated with flushing the CVCS letdown radiation monitor is not permitted

BASES (Continued)

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 operation of one RCP in MODES 3, 4, and 5 provides adequate flow to ensure mixing, prevent stratification, and produce gradual reactivity changes during RCS boron concentration reductions. The reactivity change rate associated with boron reduction will, therefore, be within the transient mitigation capability of the Boron Dilution Mitigation System (BDMS). With no reactor coolant loop in operation in either MODES 3, 4, or 5, boron dilutions must be terminated and dilution sources isolated. The boron dilution analysis in these MODES takes credit for the mixing volume associated with having at least one reactor coolant loop in operation. LCO 3.3.9, "Boron Dilution Mitigation System (BDMS)," contains the requirements for the BDMS.

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RCS Loops - MODE 5 (Loops Filled) satisfies Criterion 4 of 10CFR50.36(c)(2)(ii).

all

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 wide range water level ≥ 86%. As shown in Reference 3, any narrow range level indication above 7% will ensure the SG tubes are covered. 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 wide range water levels ≥ 86%. 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. The 1 hour time period is adequate to perform the necessary testing, 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:

(continued)

BASES

LCO (continued)

a. No operations are permitted that would dilute the RCS boron concentration with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1, thereby maintaining the margin to criticality. Introduction of reactor makeup water into the RCS from the Chemical and Volume Control System mixing tee is not permitted when no RCS loop is in operation. Boron dilution with coolant at boron concentrations less than required to assure the SDM is maintained is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation; and

INSERT A

INSERT A1

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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 ≤ 275°F. This restriction is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started.

Note 4 provides for an orderly transition from MODE 5 to MODE 4 during a planned heatup by permitting removal of RHR loops from operation when at least one RCS loop is in operation. This Note provides for the transition to MODE 4 where an RCS loop is permitted to be in operation and replaces the RCS circulation function provided by the RHR loops.

RHR pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. A SG can perform as a heat sink via natural circulation when it has an adequate water level and is OPERABLE.

APPLICABILITY

In MODE 5 with RCS loops filled, this LCO requires forced circulation of the reactor coolant to remove decay heat from the core and to provide proper boron mixing. One loop of RHR provides sufficient circulation for these purposes. However, one additional RHR loop is required to be OPERABLE, or the secondary side wide range water level of at least two SGs is required to be ≥ 86%.

(continued)

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INSERT A

, operation of CVCS resin vessels configured with resin for dilution during normal operation is not permitted, and operation of the purge line associated with flushing the CVCS letdown radiation monitor is not permitted

INSERT A1

Note that CVCS resin vessels include the resin vessels of its subsystem the BTRS.

BASES

APPLICABILITY (continued)

Operation in other MODES is covered by:

LCO 3.4.4, "RCS Loops - MODES 1 and 2";
LCO 3.4.5, "RCS Loops - MODE 3";
LCO 3.4.6, "RCS Loops - MODE 4";
LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled";
LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level" (MODE 6); and
LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level" (MODE 6).

ACTIONS

A.1 and A.2

If one RHR loop is inoperable and the required SGs have secondary side wide range water levels < 86%, redundancy for heat removal is lost. Action must be initiated immediately to restore a second RHR loop to OPERABLE status or to restore the required SG secondary side water levels. Either Required Action A.1 or Required Action A.2 will restore redundant heat removal paths. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

B.1 and B.2

If no RHR loop is in operation, except during conditions permitted by Notes 1 and 4, or if no loop is OPERABLE, all operations involving introduction of coolant, into the RCS, with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 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 RCP is required to provide proper mixing. 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. Introduction of reactor makeup water into the RCS from the Chemical and Volume Control System mixing tee is not permitted when no RCS loop is in operation, consistent with Required Action C.1 of LCO 3.3.9, "Boron Dilution Mitigation System (BDMS)." The immediate Completion Times reflect the importance of maintaining operation for heat removal.

(continued)

INSERT A
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INSERT A

, operation of CVCS resin vessels configured with resin for dilution during normal operation is not permitted, and operation of the purge line associated with flushing the CVCS letdown radiation monitor is not permitted

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.8 RCS Loops - MODE 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 flow provided by one RHR loop is adequate for decay heat removal.

The operation of one RCP in MODES 3, 4, and 5 provides adequate flow to ensure mixing, prevent stratification, and produce gradual reactivity changes during RCS boron concentration reductions. The reactivity change rate associated with boron reduction will, therefore, be within the transient mitigation capability of the Boron Dilution Mitigation System (BDMS). With no reactor coolant loop in operation in either MODES 3, 4, or 5, boron dilutions must be terminated and dilution sources isolated. The boron dilution analysis in these MODES takes credit for the mixing volume associated with having at least one reactor coolant loop in operation. LCO 3.3.9, "Boron Dilution Mitigation System (BDMS)," contains the requirements for the BDMS.

RCS loops in MODE 5 (loops not filled) satisfies Criterion 4 of 10CFR50.36(c)(2)(ii).

all TSBCN 02-016

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

(continued)

BASES

LCO (continued)

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 ≤ 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 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. Introduction of reactor makeup water into the RCS from the Chemical and Volume Control System mixing tee is not permitted when no RCS loop is in operation.

INSERT A

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

INSERT A1

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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.

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).

Since LCO 3.4.8 contains Required Actions with immediate Completion Times, it is not permitted to enter LCO 3.4.8 from either LCO 3.4.7, "RCS Loops – MODE 5, Loops Filled" or from MODE 6 unless the requirements of LCO 3.4.8 are met.

(continued)

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INSERT A

, operation of CVCS resin vessels configured with resin for dilution during normal operation is not permitted, and operation of the purge line associated with flushing the CVCS letdown radiation monitor is not permitted

INSERT A1

Note that CVCS resin vessels include the resin vessels of its subsystem the BTRS.

BASES (Continued)

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 introduction of coolant, into the RCS, with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 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 RCP for proper mixing so that inadvertent criticality can be prevented. 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. Introduction of reactor makeup water into the RCS from the Chemical and Volume Control System mixing tee is not permitted when the RCS loops are not filled or when no RCS loop is in operation, consistent with Required Action C.1 of LCO 3.3.9, "Boron Dilution Mitigation System (BDMS)." 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.

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INSERT A

SURVEILLANCE REQUIREMENTS

SR 3.4.8.1

This SR requires verification every 12 hours that one 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 3.4.8.2

Verification that a second RHR pump is OPERABLE ensures that an additional pump can be placed in operation, if needed, to maintain decay

(continued)

TSB CN 02-016

INSERT A

, operation of CVCS resin vessels configured with resin for dilution during normal operation is not permitted, and operation of the purge line associated with flushing the CVCS letdown radiation monitor is not permitted

B 3.9 REFUELING OPERATIONS

B 3.9.2 Unborated Water Source Isolation Valves

TSBCN 02-016

BASES

BACKGROUND

INSERT 1

During MODE 6 operations, all isolation valves for reactor makeup water sources containing unborated water that are connected to the Reactor Coolant System (RCS) must be closed to prevent unplanned boron dilution of the reactor coolant. The isolation valves (BGV0178 and BGV0601) must be secured in the closed position.

Administrative controls will limit the volume of unborated water that can be added to the refueling pool for decontamination activities in order to prevent diluting the refueling pool and RCS below the specified limits (Ref. 3). (See Bases for Specification 3.9.1.)

APPLICABLE SAFETY ANALYSES

The possibility of an inadvertent boron dilution event (Ref. 1) occurring during MODE 6 refueling operations is precluded by adherence to this LCO, which requires that potential dilution sources be isolated. Closing the required valves during refueling operations prevents the flow of unborated water to the filled portion of the RCS. The valves are used to isolate unborated water sources. These valves have the potential to indirectly allow dilution of the RCS boron concentration in MODE 6. By isolating unborated water sources, a safety analysis for an uncontrolled boron dilution accident in accordance with the Standard Review Plan (Ref. 2) is not required for MODE 6.

all

that are connected to the RCS.

The RCS boron concentration satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

INSERT 2

This LCO requires that flow paths via BGV0178 and BGV0601 to the RCS from unborated water sources be isolated to prevent unplanned boron dilution during MODE 6 and thus avoid a reduction in SDM.

APPLICABILITY

In MODE 6, this LCO is applicable to prevent an inadvertent boron dilution event by ensuring isolation of all sources of unborated water to the RCS.

For all other MODES, the boron dilution accident was analyzed and was found to be capable of being mitigated.

(continued)

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INSERT 1
Bases 3.9.2

During MODE 6 operations, all unborated water source isolation valves that are connected to the Reactor Coolant System (RCS) must be closed to prevent unplanned boron dilution of the reactor coolant. The isolation valves must be secured in the closed position.

Boron dilution in Mode 6 could occur from reactor makeup water sources containing unborated water or boron dilution could also occur from ion exchange resin contained within the CVCS and BTRS for water chemistry control. Note that CVCS resin vessels include the resin vessels of its subsystem the BTRS. While the purpose of the resin is to control water impurity levels and clarity, it may remove a slight amount of boron from the system's water stream when the resin is initially placed in service. The purified water stream is returned to the RCS at a slightly lower boron concentration until the resin reaches chemical equilibrium and is no longer a dilution source. Operations involving the conditioning and management of resin are permitted in Mode 6 because the amount of global RCS boron removed from the RCS during the equilibrium period can be calculated beforehand. As such, these operations are conducted as planned dilutions using administrative controls.

In Mode 6, operation of the CVCS letdown gamma radiation detector SJRE001 is not required. However, flushing the detector with unborated water for maintenance during Mode 6 would be performed as a planned dilution using administrative controls.

Some unborated water sources, that are not connected to the RCS in their as-built configuration, can be temporarily configured (ex. flexible hose connected) to provide a direct path for unborated water into the RCS. A routine Mode 6 activity requiring this temporary configuration is decontamination of the refueling pool. However, administrative controls will limit the volume of unborated water that can be added to the refueling pool for decontamination or planned dilution activities, in order to prevent diluting the refueling pool and RCS below the specified limits (Ref. 3). (See the Bases for LCO 3.9.1, "Boron Concentration".

Callaway reactivity management provides systematic direction to control activities that impact plant reactivity. This means precluding unplanned or uncontrolled occurrences impacting reactivity (positive or negative), including inadvertent boron dilution events.

Plant operations may require planned boron management evolutions. Reactivity management provides provisions that any planned activities and evolutions with the potential to impact reactivity are identified; are conducted in a controlled manner; are evaluated to ensure the effects of reactivity changes are known and monitored; and are performed by plant personnel briefed so that any anomalous indications are met with

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INSERT 1 continued
Bases 3.9.2

conservative action. Specifically, administrative controls include: (1) adherence to approved procedures; (2) planned evolutions and briefings; (3) calculations for the impact on boron concentrations prior to evolutions; (4) reviews by licensed operators; (5) valve identification with temporary tagging; and (6) prompt verification that unborated water source isolation valves are closed and secured after completion of any planned dilution activities.

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INSERT 2
Bases 3.9.2

This LCO requires that unborated water source flow paths connected to the RCS be isolated to prevent unplanned boron dilution during MODE 6 and thus avoid a reduction in SDM. The unborated water source isolation valves must be closed and secured. Isolation valves connected to the RCS include: (1) unborated reactor makeup water (BGV0178 and BGV0601), (2) CVCS resin vessels configured with resin for dilution during normal operation (BG8522A, BG8522B, BGV0039, BGV0043, BGV0051, and BGV0055) and (3) unborated flushing water for the CVCS letdown radiation monitor (SJV0703).

Some unborated water sources, that are not connected to the RCS in their as-built configuration, can be temporarily configured (ex. flexible hose connected) to provide a direct path for unborated water into the RCS. Isolation valves not connected to the RCS, but modified via temporary configuration to provide a direct path for unborated water into the RCS include: (1) BLV0078, (2) BLV0079 and (3) BLV0055.

This LCO is modified by a NOTE to allow unborated water sources to be unisolated under administrative controls for planned boron dilution evolutions. The NOTE also permits unborated water sources, not connected to the RCS in their as-built configuration, but temporarily configured (ex. flexible hose connected) to provide a direct path for unborated water into the RCS, to be used under administrative controls for planned boron dilution evolutions.

During refueling activities, it may be necessary for an unborated water source to be unisolated. Based on License Amendment 97, administrative controls are used to limit the volume of unborated water which can be added to the refueling pool for decontamination activities in order to prevent diluting the refueling pool boron concentration below TS limits. The administrative controls in this case are identified in TS Bases 3.9.1 and are applicable to the LCO NOTE exception for the following specific isolation valves: BLV0078, BLV0079 and BLV0055.

In Mode 6, other plant activities may require unborated water sources to be unisolated under administrative controls for planned boron dilution evolutions. The LCO NOTE allows an isolation exception for use of the reactor makeup water system, for operation of CVCS resin vessels, and for maintenance to flush the CVCS letdown gamma radiation detector SJRE001 with unborated reactor makeup water. The administrative controls include plant reactivity management requirements and operational awareness and are described in the TS Bases 3.9.2 Background. These requirements are applicable to the LCO NOTE exception for the following specific isolation valves: BGV0178, BGV0601, BG8522A, BG8522B, BGV0039, BGV0043, BGV0051, BGV0055 and SJV0703.

BASES (Continued)

ACTIONS

The ACTIONS table has been modified by a Note that allows separate Condition entry for each unborated water source isolation valve.

A.1

Continuation of CORE ALTERATIONS is contingent upon maintaining the unit in compliance with this LCO. With any valve used to isolate unborated water sources not secured in the closed position, all operations involving CORE ALTERATIONS ~~must be suspended immediately~~. The Completion Time of "~~immediately~~" for performance of Required Action A.1 shall ~~not preclude~~ completion of movement of a component to a safe position.

Condition A has been modified by a Note to require that Required Action A.3 be completed whenever Condition A is entered.

A.2

Source

Preventing inadvertent dilution of the reactor coolant boron concentration is dependent on maintaining the unborated water isolation valves ~~(BGV0178 and BGV0691 secured closed.)~~ Securing the valves in the closed position, under administrative controls, ensures that the valves are not inadvertently opened. The Completion Time of "immediately" requires an operator to initiate actions to close an open valve and secure the isolation valve in the closed position immediately. Once actions are initiated, they must be continued until the valves are secured in the closed position.

Closed and secured.

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A.3

Due to the potential of having diluted the boron concentration of the reactor coolant, SR 3.9.1.1 (verification of boron concentration) must be performed whenever Condition A is entered to demonstrate that the required boron concentration exists. The Completion Time of 4 hours is sufficient to obtain and analyze ~~a reactor~~ coolant sample for boron concentration.

(continued)

BASES (Continued)

SURVEILLANCE REQUIREMENTS

SR 3.9.2.1

INSERT 3

~~Valves BGV0176 and BGV0607~~ are to be secured closed to isolate possible dilution paths. The likelihood of a significant reduction in the boron concentration during MODE 6 operations is remote due to the large mass of borated water in the refueling pool and the fact that all unborated water sources are isolated, precluding a dilution. The boron concentration is checked every 72 hours during MODE 6 under SR 3.9.1.1. This Surveillance demonstrates that the valves are closed through a system walkdown. The 31 day Frequency is based on engineering judgment and is considered reasonable in view of other administrative controls that will ensure that the valve opening is an unlikely possibility.

If new paragraph

after flood-up

REFERENCES

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1. FSAR, Section 15.4.6.
2. NUREG-0800, Section 15.4.6.
3. Amendment 97 to Facility Operating License No. NPF-30, Callaway Unit 1, dated March 31, 1995.

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INSERT 3

Isolation valves for unborated reactor makeup water (BGV0178 and BGV0601), CVCS resin vessels configured with resin for dilution during normal operation (BG8522A, BG8522B, BGV0039, BGV0043, BGV0051, and BGV0055), and the purge line used during flushing of CVCS letdown radiation monitor (SJV0703)

ULNRC- 05345

ATTACHMENT 5

SUMMARY OF REGULATORY COMMITMENT

SUMMARY OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by AmerenUE, Callaway Plant in this document. Any other statements in this submittal are provided for information purposes and are not considered to be commitments. Please direct questions regarding these commitments to Dave E. Shafer, Superintendent, Licensing at AmerenUE, Callaway Plant, (314) 554-3104.

COMMITMENT	Due Date/Event
The proposed amendment will be implemented within 90 days after approval	90 days following NRC approval
Administrative controls consisting of written procedures will be established prior to the implementation of the proposed changes. The procedural controls require that in MODE 6 each valve used to isolate unborated water sources shall be secured in the closed position.	90 days following NRC approval
Administrative controls consisting of written procedures will ensure prompt verification that unborated water source isolation valves are closed and secured after completion of any planned boron dilution activities.	90 days following NRC approval
Administrative controls consisting of written procedures will be established prior to the implementation of the proposed changes. The procedural controls require that when both BDMS trains are inoperable, or when no reactor coolant loop is in operation, and when in MODE 2 (below P-6 setpoint), 3, 4, and 5, each valve used to isolate unborated water sources shall be secured in the closed position.	90 days following NRC approval
Identified TS Bases and Callaway FSAR changes will be incorporated into the TS Bases and the Callaway FSAR during implementation of the amendment.	During implementation of the amendment