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Callaway Plant

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September 9, 2005

U.S. Nuclear Regulatory Commission
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Ladies and Gentlemen: ULNRC- 05206

Ameren UE

DOCKET NUMBER 50-483
CALLAWAY PLANT
UNION ELECTRIC COMPANY
LICENSE AMENDMENT REQUEST OL 1258
REVISION TO TECHNICAL SPECIFICATION 3.7.3,
"MAIN FEEDWATER ISOLATION VALVES (MFIVs)"

References:
1. ULNRC-04592 dated June 27, 2003
2. Callaway License Amendment Number 159 dated March 11, 2004
3. ULNRC-05056 dated September 17, 2004
4. ULNRC-05071 dated October 27, 2004
5. Callaway License Amendment Number 167 dated May 31, 2005

AmerenUE hereby requests an amendment of the Facility Operating License for the Callaway Plant (License No. NPF-30). Specifically, AmerenUE requests revision of Technical Specification (TS) 3.7.3, "Main Feedwater Isolation Valves (MFIVs)," to revise Surveillance Requirement (SR) 3.7.3.1 and SR 3.7.3.2, and to add new SR 3.7.3.3. Current SR 3.7.3.1 includes a 15-second stroke time requirement for the MFIVs as requested in Reference 1 and approved by the NRC in Reference 2, i.e. Amendment 159 to the Callaway Operating License. Subsequent to Amendment 159, analyses were completed in support of the Callaway Replacement Steam Generator (RSG) Program. The analyses explicitly model a 15-second MFIV stroke time delay for all operating conditions. These analyses are described in the amendment request that was submitted in support of the RSG Program (Reference 3). The changes proposed therein are currently under review by the NRC.

In Reference 4, AmerenUE requested an amendment to add requirements for the Main Feedwater Regulating Valves (MFRVs) and the Main Feedwater Regulating Valve Bypass Valves (MFRVBVs) in TS 3.7.3. That amendment request was approved by the NRC in Reference 5; however, the changes have not yet been implemented at Callaway, but will be during the Refuel 14 outage, Fall 2005.

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The proposed revision to SR 3.7.3.1 would remove the MFIVs from the requirement to verify a closure time of less than or equal to 15 seconds, as SR 3.7.3.1 would continue to require the MFRVs and MFRVBVs to meet the requirement. Proposed new SR 3.7.3.3 would require the MFIVs to instead meet the requirement for verifying that the closure time of each MFIV is within the limits of Figure 3.7.3-1. Figure 3.7.3-1 is a new/proposed curve which specifies the MFIV isolation time limit as a function of steam pressure. Changes are also proposed for SR 3.7.3.1 and SR 3.7.3.2 in order to delete the Note specified for each of these surveillance requirements that is no longer needed.

Essential information and documents are provided as attachments to this letter. Attachment 1 to this submittal contains a description of the proposed change, the supporting technical analyses, and the significant hazards determination. Attachments 2 and 3 contain marked-up and revised TS pages, respectively. Attachment 4 contains proposed changes to the TS Bases (in marked-up form). These Bases changes are provided for information only and will be implemented pursuant to the TS Bases Control Program, TS 5.5.14, upon approval of this license amendment. Attachment 6 provides the MFIV Performance Curve (referred to in Attachment 1).

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

With regard to applicable regulatory requirements, the proposed TS changes have been evaluated pursuant to CFR 50.92 and it has been determined that this amendment application does not involve a significant hazard consideration. In addition, evaluation of the proposed changes against the requirements of 10 CFR 51.22(b) has determined that no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of a license amendment for the proposed changes. The bases for these determinations are included in Attachment 1.

Approval of this amendment application is requested on an expedited basis, but no later than by March 31, 2006, should unexpected plant conditions arise that require stroke-time testing of the MFIVs. It is also requested that the NRC allow this amendment to be implemented no later than MODE 3 entry (ascending) during startup from the Refuel 15 outage.

Finally, pursuant to 10 CFR 50.91, a copy of this application is being provided to the designated Missouri State official.

This amendment application has been reviewed by Callaway's Onsite Review Committee and Nuclear Safety Review Board. Please contact us for any questions you may have regarding this amendment application.

I declare under penalty of perjury that the foregoing is true and correct.

Very truly yours,

Executed on: September 9, 2005

Keith D. Young
Manager, Regulatory Affairs

Attachments:
1) Evaluation
2) Markup of Technical Specification pages
3) Retyped Technical Specification pages (Later)
4) Proposed Technical Specification Bases changes (for information only)
5) Summary of Regulatory Commitments
6) MFIV Performance Curve

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ULNRC-05206

ATTACHMENT 1

EVALUATION

LICENSE AMENDMENT REQUEST OL 1258
REVISION TO TECHNICAL SPECIFICATION 3.7.3,
"MAIN FEEDWATER ISOLATION VALVES (MFIVs)"

EVALUATION

1.0 DESCRIPTION

AmerenUE requests an amendment of the Facility Operating License for the Callaway Plant (License No. NPF-30). Specifically, AmerenUE requests revision of Technical Specification (TS) 3.7.3, "Main Feedwater Isolation Valves (MFIVs)," to revise Surveillance Requirements (SR) 3.7.3.1 and SR 3.7.3.2 and to add new SR 3.7.3.3. Current SR 3.7.3.1 specifies a 15-second stroke time requirement for the MFIVs that was requested by AmerenUE (References 7.1 and 7.2) and approved by the NRC in Amendment 159, dated March 11, 2004 to the Callaway Operating License.

Subsequent to Amendment 159, analyses were completed in support of the Callaway Replacement Steam Generator (RSG) Program. Those analyses, which continued to explicitly model a 15-second MFIV stroke time delay for all applicable operating conditions, were submitted to the NRC as part of the amendment request to support the RSG Program (Reference 7.3) and are currently under review by the NRC. In addition, by letter dated October 27, 2004 (Reference 7.4), AmerenUE requested an amendment to add requirements for the Main Feedwater Regulating Valves (MFRVs) and the Main Feedwater Regulating Valve Bypass Valves (MFRVBVs) to TS 3.7.3, including, in particular, SR 3.7.3.1 and SR 3.7.3.2. This amendment request was approved by the NRC in Amendment 167, dated May 31, 2005.

The proposed revision to SR 3.7.3.1 deletes the MFIVs from the requirement for verifying a closing stroke time of less than or equal to 15 seconds. Based on Amendment 167, the MFRVs and MFRVBVs are still required to meet the requirement. For the MFIVs, instead, proposed new SR 3.7.3.3 would specify a stroke time test requirement more appropriate to the MFIV system-medium actuator design and its associated system-pressure dependent stroke time. Specifically, SR 3.7.3.3 would require verifying that the closure time for each MFIV is within the limits of proposed Figure 3.7.3-1. Proposed Figure 3.7.3-1 is a curve of the MFIV isolation time limit as a function of system pressure, in lieu of a single-valued stroke time limit as currently specified.

SR 3.7.3.2 requires verifying that each valve actuates to the isolation position on an actual or simulated actuation signal. Based on Amendment 167, SR 3.7.3.2 will continue to apply to the MFRVs and the MFRVBVs, as well as the MFIVs. However, a change is proposed for SR 3.7.3.2, as well as SR 3.7.3.1, in order to delete a Note currently specified for each of these surveillance requirements. The Note allowed entry into and operation in MODE 3 prior to performing either of the surveillances for the MFIVs. The Note is no longer needed in light of the changes being made for SR 3.7.3.1 and the addition of proposed SR 3.7.3.3.

The corresponding Technical Specification Bases changes are also attached (for information only). Section 7.0 of this Evaluation provides a listing of references cited herein.

2.0 PROPOSED CHANGES

The proposed revision to SR 3.7.3.1 deletes the MFIVs from the requirement for verifying a stroke time of less than or equal to 15 seconds. The term "MFIV" is removed from the statement of the surveillance requirement. Based on Amendment 167, this SR would continue to require the MFRVs and MFRVBVs to meet the 15-second stroke time limit (which is still applicable to those valves).

A Note on SR 3.7.3.1 states: "Only required to be performed in MODES 1 and 2." As an additional change to SR 3.7.3.1, this Note is being eliminated. The Note allowed entry and operation in MODE 3 prior to performing the surveillance. In view of the proposed change for SR 3.7.3.1 and the addition of proposed SR 3.7.3.3 (and its associated acceptance curve), stroke time limits can clearly be applied to all applicable Modes of plant operation and conformance to the proposed acceptance curve for SR 3.7.3.3 can be verified prior to entry into Mode 3. Thus, the Note is no longer needed.

Similarly, a Note on SR 3.7.3.2 states: "Only required to be performed in MODES 1 and 2." As a proposed change to SR 3.7.3.2, this Note is also being eliminated. The Note allowed entry and operation in MODE 3 prior to performing the surveillance. In view of the proposed changes, the Note is no longer needed.

Proposed new SR 3.7.3.3 would specify a stroke-time test requirement more appropriate to the MFIV system-medium actuator design and its associated system-pressure dependent stroke time. Specifically, the statement of proposed SR 3.7.3.3 requires verifying that the closure time for each MFIV is within the limits of Figure 3.7.3-1, which is a new figure that is being added to TS 3.7.3. Figure 3.7.3-1 is a curve of the MFIV isolation time limit as a function of steam generator pressure, in lieu of a single-valued stroke time limit as currently specified. The frequency for performing this surveillance, i.e., for verifying that the MFIV isolation (closure) time is within the limits of Figure 3.7.3-1, would continue to be in accordance with the Inservice Testing Program.

Attachment 2 provides the existing TS pages with the proposed markups.

3.0 BACKGROUND

The MFIV actuators at Callaway were replaced during Refuel 13 with new actuators of a type that uses the pressure of the process fluid to stroke the valves. An inherent design feature of this type of actuation is that the valve stroke time is a function of the system conditions (pressure and temperature). The proposed TS changes are based on the fact that the 15-second stroke time may not be a bounding delay for all conditions under which the MFIVs are required to be operable. The MFIVs are required to be OPERABLE in MODES 1, 2, and 3. The MFIVs are OPERABLE when isolation times are within limits (when given a fast close signal) and the valves are capable of closing on an isolation actuation signal.

Because the MFIV system-medium actuation trains make the MFIV stroke time system-pressure dependent, the valves tend to close more slowly at lower steam generator pressures.. To ensure operational margin, the MFIV TS stroke-time requirement is increased for plant conditions at lower steam generator pressures. Specifically, at lower pressures (secondary side pressure of approximately 615 psia), the MFIV stroke time may exceed the 15 seconds (established by Amendment 159) when the valves are closed using only one of the two actuation trains designed for each MFIV.*

Note that following assembly of each MFIV system-medium actuator, a hot functional test was performed using Callaway's spare MFIV body. Through this testing it was found that the MFIV would close within 60 seconds with as little as 0 psig of system pressure. Testing performed by the vendor as well as testing performed during Refuel 13 confirmed that the MFIVs can close within 15 seconds using a single actuation train in MODES 1 and 2, as well as in MODE 3 when at normal operating temperature/normal operating pressure (NOP/NOT) conditions. Testing performed for lower MODE 3 conditions (secondary side pressure $\leq$ 615 psia), also confirmed that the valve stroke time was $\leq$ 15 seconds based on correlation data and assuming the use of both actuation trains. These test data confirm the capability of the MFIVs to meet the limits of the proposed curve (i.e., proposed TS Figure 3.7.3-1) over the range of operation using one (each/either) actuation train. A more complete picture of MFIV stroke time performance (as a function of system pressure) is given in Attachment 6. Attachment 6 provides the MFIV Performance Curve and gives the operational capabilities of the MFIVs, i.e., stroke time as a function of system pressure.

A comparison of the requirements of SR 3.7.3.1 against the Applicability of TS 3.7.3 reveals an inadequacy in this SR. In particular, it may be noted that the applicable Modes for TS 3.7.3 are Modes 1, 2, and 3. Per the Note currently attached to SR 3.7.3.1, however, the SR is only required to be performed in Modes 1 and 2. This situation makes it unclear as to what is required for Mode 3. Specifically, it is unclear as to whether the acceptance criterion (stroke time limit) for this SR is required to be met in Mode 3 even though the SR is not required to be performed in this Mode. With the new steam generator-pressure dependent stroke time proposed for the MFIVs under new SR

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* Although not explicitly specified by the TS surveillance itself, stroke time testing for the valves is assumed to be done using one actuation train. This is based on the single-failure design of the actuation trains and also on the fact that the TS 3.7.3 Bases state that the MFIV closure times are verified "from each actuation train."

3.7.3.3, a stroke time limit that can clearly be met for Mode 3 will be included in the proposed curve (i.e., proposed Figure 3.7.3-1), given that the curve includes steam generator pressures anticipated for all applicable Modes. In this regard, the current Specification is inadequate and is therefore being revised under the guidance of Administrative Letter 98-10.

AmerenUE is proposing a revised Technical Specification that will capture the dependency on steam generator pressure of the MFIV stroke time. The proposed TS change provides the requirement that the closure time for each MFIV is within the limits of Figure 3.7.3-1. Figure 3.7.3-1 is a curve of the MFIV isolation time limit as a function of steam generator pressure and provides a variable stroke time for the MFIVs. Having a stroke time limit requirement that is dependent on steam generator pressure enables performance of the required MFIV surveillance at any particular operating condition bounded by the curve.

4.0 TECHNICAL ANALYSIS

4.1 Evaluation of Proposed MFIV Stroke Time Limits

The MFIVs isolate non-safety related portions of the feedwater and condensate systems from the safety-related portions. In the event of a secondary side pipe rupture inside containment, the valves (1) limit the quantity of high energy fluid that enters containment through the break, and (2) provide an acceptable pressure boundary for the controlled addition of auxiliary feedwater (AFW) to the intact loops.

The safety-related functions of the MFIV actuation trains are to close an MFIV within the specified time frame and to provide an acceptable pressure boundary for AFW delivery. TS 3.7.3 currently specifies a valve stroke time of less than or equal to 15 seconds throughout the LCO Applicability, i.e., throughout MODES 1, 2, and 3.

The portion of the feedwater system from the steam generators to the MFIVs is safety related and is required to function following a design basis accident (DBA).

Requiring the MFIVs to close within a stroke time limit that is dependent upon steam generator pressure still ensures that the applicable FSAR Chapter 15 events that credit MFIV closure remain bounding. References 7.1, 7.2, and 7.3 evaluated the effect of a 15-second MFIV closure time on the current accident analyses and on the accident analyses in support of the Callaway RSG Program.

Because a longer MFIV stroke time (90-seconds) was determined to be bounding for those secondary system pressures that correspond to operating conditions at or below the reference permissive P-11, the impact of a 90-second MFIV closure time on the accident analyses was analyzed where appropriate [i.e., Loss of Normal Feedwater

(LONF), Loss of Non-Emergency AC Power to the Station Auxiliaries (LOAC), and Feedline Break (FLB)]. The impacted accident analyses that credit feedwater isolation include the Hot Zero Power (HZP) Steamline Break (with respect to core response), Feedwater Malfunction, Loss of Normal Feedwater (LONF), Loss of Non-Emergency AC Power to the Station Auxiliaries (LOAC), and Feedline Break (FLB). Evaluations of these events for the impact of the revised stroke time (90-seconds for the appropriate plant conditions) are discussed below. In addition, evaluations for the Steam Generator Tube Rupture (SGTR) and Containment Integrity – Main Steamline Break (MSLB) Mass and Energy (M&E) Releases Inside/Outside Containment and Steam Releases for Dose are summarized below.

HZP Steamline Break (Core Response)

The HZP Steamline Break (SLB) event is a limiting and sufficiently conservative licensing basis to demonstrate compliance with applicable criteria for SLB transients and the associated reactor core response to such transients, as documented in the Steamline Break topical WCAP-9226 (Reference 7.6). Although the HZP SLB event is also analyzed at full-power conditions for Callaway, the full-power case is not adversely affected by the proposed change since feedwater isolation occurs after the time when the minimum departure from nucleate boiling ratio (DNBR) is reached, and therefore feedwater isolation is not explicitly modeled for the full-power event. The long-term consequences of the cooldown resulting from the full-power steamline break are bounded by the FSAR case analyzed from HZP conditions.

Although main feedwater would not be available during no-load (HZP) conditions, main feedwater is conservatively assumed in the evaluation to increase to a nominal (full-power) mass flow rate at the beginning of the transient. This maximizes the initial feedwater flow to increase the heat removal capacity of the steam generators. This feedwater flow is maintained until feedwater isolation occurs. Thus, the SLB analyses use feedwater isolation to limit the cooldown of the RCS.

Further, the limiting SLB cases analyzed for Callaway utilize a very conservative auxiliary feedwater (AFW) flow model, also aimed at maximizing the cooldown of the RCS. This model preferentially directs the majority of the AFW flow to the faulted steam generator (i.e., the steam generator with the broken steam line) from the start of the transient resulting in very significant asymmetric RCS loop temperatures. It is this asymmetric temperature distribution in the core that makes the SLB a limiting DNBR transient.

Due to the very rapid depressurization of the steam generators that results from a HZP steamline break accident, and in order to address the impact of the proposed change to the MFIV stroke time on the event, two distinct scenarios were considered and are discussed in more detail below. The first scenario is a steamline break initiated from operating conditions below P-11 (with an MFIV stroke time conservatively assumed to be 90 seconds). The second scenario is one that is initiated from operating conditions above P-11 where the depressurization is such that complete MFIV closure may or may not occur prior to the pressure at the MFIV location reaching the pressure corresponding to P-11 (approximately 615 psia, reference pressure). As discussed below, an MFIV stroke time of 15 seconds is assumed for this scenario (consistent with the value currently analyzed).

With regard to the first scenario described above, steamline break events initiated from conditions below P-11, with an expected MFIV stroke time in excess of 15 seconds, are not limiting. Plant-specific procedures require the plant to be borated to Mode 5 (200°F) levels when the safety injection (SI) system is isolated (which occurs at the P-11 setpoint). This requirement was implemented specifically to prevent a return to power following a SLB with no SI available. Furthermore, the addition of main feedwater to the steam generators from these conditions would be significantly less than that assumed in the current FSAR analysis. Based on this, a SLB event initiated from these conditions would not challenge the applicable DNBR limits regardless of the MFIV stroke time assumed.

The most limiting depressurization of the secondary side initiated from conditions above P-11 is a double-ended rupture of the steamline from HZP conditions (i.e., RCS pressure of 2250 psia and temperature of 557°F), consistent with the FSAR analysis. Under these conditions, the SI system would still be operable but the RCS would not yet be borated to Mode 5 conditions. Based on Reference 7.3, it has been determined that the steam pressure in the intact steam generators stays above the reference steam generator pressure prior to the closure of the MFIVs. Further more, it has been confirmed that the continued operation of the main feedwater pumps prevent system pressure at the location of the MFIV from dropping below 615 psia. This ensures that feedwater isolation in all four loops for this limiting case will occur as currently analyzed. Based on this, the RSG HZP case is not adversely affected by the proposed MFIV stroke time modification.

Since the continued operation of the main feedwater pumps ensure that the system pressure at the location of the MFIVs will not drop below 615 psia, consideration of additional steamline break cases from other conditions above P 11 is not needed. Note that, although the pressure at the MFIV location could drop below 615 psia if feedwater pumps were not operating, there would be no need for feedwater isolation as there would be no feedwater being added to the steam generators. Therefore it can be concluded that the analysis discussed in Reference 7.3, performed from bounding HZP conditions, incorporating a 15-second MFIV stroke time and an extremely conservative main and auxiliary feedwater flow model, continues to be limiting with respect to the post-trip DNBR consequences following a steamline break event.

Based on the above, the increase in MFIV stroke time is acceptable with respect to the SLB event...

Feedwater Malfunction

Based on Reference 7.3, events of this type have been explicitly analyzed at hot full-power (HFP) conditions, the limiting condition with respect to DNBR. The HFP cases analyzed cover possible system malfunctions that could result in either increased feedwater flow or decreased feedwater temperature. Since there is no significant decrease in secondary side pressure during such an event prior to the time feedwater isolation occurs, it is reasonable to expect that the actual MFIV stroke time would be no more than the 15 seconds assumed in the analyses. Feedwater malfunction events initiated from conditions where the MFIV stroke time to be assumed would be in excess of 15 seconds, aside from being highly unlikely, would not be severe enough to challenge the safety analysis DNBR limits. Feedwater flow is significantly reduced in lower mode conditions.

Based on this, it is concluded that the proposed changes to the MFIV stroke time are acceptable with respect to feedwater malfunction events.

Loss of Normal Feedwater/Loss of Non-Emergency AC Power to the Station Auxiliaries

Although the LONF and LOAC events are discussed separately in the Callaway FSAR, they are addressed jointly in regards to assessing the impact of the MFIV stroke time limit on the accident analyses. Both events have nearly identical accident analysis information and both events are loss of heat sink accidents characterized by a complete loss of normal feedwater with the reactor at full power.

The main feedwater line check valves at Callaway are located downstream (inside containment) of the auxiliary feedwater (AFW) injection point rather than upstream (outside containment) as in other plant designs. This configuration demands a protection system functional requirement to ensure that all feedwater isolation and control valves close in response to a low-low steam generator water level signal. Although feedwater isolation is not explicitly modeled as such in the Loss of Normal Feedwater/Loss of Non-Emergency AC Power analyses, the analyzed time sequence includes consideration of an assumed AFW purge volume that implies the occurrence of feedwater isolation. The AFW purge volume is assumed to be the total volume of piping between the MFIV and the steam generator inlet. When main feedwater is lost, as is the case in these events, the purge volume will be filled with residual main feedwater at a high temperature. Since this water must be displaced before colder AFW water can reach the steam generators, this represents an additional delay (beyond the assumed 60-second AFW actuation delay) before cold AFW flow may be assumed to reach the steam generators. Thus, for consistency with the current analysis of record for these events, feedwater isolation must occur prior to AFW initiation.

A loss of normal feedwater, the initiating event for these transients, could conceivably cause a rapid depressurization of the main feedwater system such that the resulting MFIV stroke time could exceed the analyzed value of 15 seconds. To conservatively bound this scenario and provide additional margin, the LONF/LOAC analyses were reanalyzed to account for a maximum MFIV stroke time of 90 seconds. Along with this, initiation of AFW flow was also delayed for 90 seconds following reactor trip on a low-low SG water level signal. The results obtained confirm that all applicable acceptance criteria for these events continue to be met.

Based on this, it is concluded that an increase in the MFIV stroke time up to 90 seconds is acceptable for the LONF/LOAC events.

Feedline Break

As explained above for the Loss of Normal Feedwater/Loss of Non-Emergency AC Power events, the Callaway configuration of the AFW system is unique. Although feedwater isolation is not explicitly modeled in the Feedline Break analysis, the assumed AFW actuation delay implies feedwater isolation occurs. For a feedline break, the total AFW actuation delay assumed in the analysis is made up of two parts. The first part is the typical delay of 60 seconds that accounts for the time from receipt of the low-low SG water level ESFAS signal until the AFW pumps reach full speed. The second part of the total AFW actuation delay is a delay that accounts for the time it takes to fill the piping volume between the MFIV and the feedline check valve. Thus, for consistency with the current analysis of record of this event, feedwater isolation must occur prior to AFW initiation.

A rupture in the main feedline would cause a rapid depressurization of the main feedwater system such that the expected response time of the feedwater isolation valves would almost certainly exceed the assumed time of 15 seconds. To conservatively address this scenario and provide additional margin, the FLB analysis performed in Reference 7.3 was reanalyzed to account for a maximum MFIV stroke time of 90 seconds. Because Callaway's unique design does not permit the filling of the feedline purge volume until after the feedwater isolation valves are fully closed, the initiation of AFW flow in the current analysis was assumed to be delayed for 90 seconds following the reactor trip on a low-low SG water level signal. The results obtained confirm that all applicable acceptance criteria for this event continue to be met.

Based on this, it is concluded that an increase in the MFIV stroke time of up to 90 seconds is acceptable for the FLB event.

<u>Steam Generator Tube Rupture (SGTR)</u>

MFIV stroke time does not affect the NSSS performance parameters, input assumptions, results, or conclusions of the SGTR thermal and hydraulic analyses (break flow/steam release). Also, conditions are note created which are more limiting than those enveloped by the analysis break flow/steam release. Therefore, the SGTR analysis remains valid.

<u>Containment Integrity – Main Steamline Break (MSLB) Mass and Energy (M&E) Releases Inside/Outside Containment and Steam Releases for Dose</u>

The analyses of the steamline break (SLB) mass & energy (M&E) releases inside containment and outside containment assume the operation of the MFIVs to isolate main feedwater flow from the faulted-loop steam generator affected by the postulated steamline break. The calculation of the steam releases for doses, used as input to a radiological analysis, does not credit the MFIVs as part of the analysis.

The SLB M&E releases outside containment are analyzed with the objective of maximizing the superheated steam release from the SGs, which adversely affects safety-related equipment in the steam tunnel (Area 5) in the Auxiliary Building. The analysis of the SLB M&E releases outside containment assumes main feedwater isolation coincident with, or shortly following, reactor trip with no delays associated with valve stroke. This is a conservative assumption for this event. Therefore, the MFIV stroke time does not have an impact on the generation of superheated steam releases and the Area 5 steam tunnel environmental temperature response.

The SLB M&E releases inside containment are analyzed with the objective of maximizing the integrated energy released to containment for purposes of determining the effect on the containment pressure and temperature design limits. Closure of the MFIV in the main feedwater line with the faulted-loop steam generator isolates the flow of main feedwater to that steam generator and reduces the mass and energy inventory released into containment.

The methodology for the analysis of the SLB M&E inside containment is documented in Reference 7.5. Conservatisms in the methodology related to feedwater flow include very large increases in the main feedwater flow rate due to the increase in the steam demand, and a large auxiliary feedwater flow rate based on maximizing the output of the AFW pumps. The safety analyses for the SLB M&E releases inside containment are performed for plant operation in Modes 1 and 2 as documented in Reference 7.5. In lower modes of plant operation, it is recognized that the Callaway plant has no significant steam flow and therefore no significant main feedwater flow to the steam generators.

The analysis of the SLB M&E releases inside containment is performed in Modes 1 and 2 when the reactor is critical and there is initially a high secondary-side pressure.

Closure of the MFIVs in each loop is assumed to limit the amount of main feedwater mass added to the steam generators. Continued main feedwater flow increases the integrated mass released into containment and causes an increase in the containment pressure, which could exceed the containment pressure limit if not restricted via fast closure of the MFIVs. The double-ended rupture SLB cases inside containment cause an asymmetric depressurization of the steam generators and exhibit a transient response that shows a large decrease in the secondary-side pressure at the time MFIV closure is credited for all the cases recently analyzed for the RSG program. However, the pressure on the upstream side of the MFIVs remains high due to the head produced by the main feedwater pumps. MFIV closure within 15 seconds as assumed in the safety analysis is provided by the pressure within the main feedwater system.

A SLB occurring in lower modes of plant operation below the P-11 permissive setpoint, whether ascending or descending in power, will not result in a significant addition of main feedwater to the faulted-loop steam generator. The main feedwater addition to the steam generators due to the increased steam flow through the postulated break location is bounded by the feedwater assumptions made for the analyses in Mode 1 and Mode 2. Therefore, the assumption of an increase in the main feedwater isolation actuation response time in the lower modes, regardless of the secondary-side pressure, does not cause a situation that is more limiting than the licensing-basis analyses of the SLB M&E releases or the containment response.

4.2 Discussion of MFIV Control Timer Change

Reference 7.1 describes the MFIV system-medium actuators and how they function to open and close. The description includes the statement that after a 30 second time delay (i.e., after the MFIVs close in response to a close demand) solenoid valves MV5 and MV6 go to the energized state (closed or pressurized position), preventing any leakage from the actuator Lower Piston Chamber. Attachment 8 to Reference 7.1 provides a diagram of the MFIV system-medium operated actuator, including the Lower Piston Chamber and the components MV5 and MV6. In response to concerns over MFIV closure during a feed water line break with no system pressure available and based upon hot functional testing of the MFIV actuators, the time delay was increased from 30 seconds to 60 seconds. Reference 7.2 provided the NRC with the statement that in order to ensure the MFIVs close during a feed water line break with no system pressure available, solenoid valves MV5 and MV6 will not go to an energized state (closed or pressurized position) until after a 60 second time delay. Re-energization of solenoid valves MV5 and MV6 after MFIV closure eliminates the high differential pressure across the MFIV actuator piston and stem rings, thereby minimizing the erosion of these rings. This time delay is non-safety related and is required strictly for commercial reasons.

Because a longer MFIV stroke time (90-seconds) was determined to be bounding for those system pressures that correspond to operating conditions at or below the permissive P-11, a corresponding change in the time delay to re-energize solenoid valves MV5 and MV6 following MFIV closure was made. The time delay was thus increased from 60 seconds to 120 seconds. This change in time delay does not affect the MFIV stroke time and has no impact on evaluation results for the affected accident scenarios. This information is primarily provided as an update in light of the information provided in Reference 7.2.

4.3 Implementation of Testing Required for Proposed Surveillance 3.7.3.3

After receipt of the amendment requested per this application, implementation of the amendment will make Figure 3.7.3-1 effective as the acceptance criterion for the MFIV stroke time test(s) required per SR 3.7.3.3. Proposed Figure 3.7.3-1 is a bounding curve that provides the required MFIV stroke time limit as a function of secondary system pressure. As described in Section 3.0, proposed Figure 3.7.3-1 is based on a performance curve that was established for the MFIVs and validated, in part, by field testing of the valves at various pressures.

Nevertheless, it is AmerenUE's intent to perform stroke-time "baseline" testing of the MFIVs at several pressure values over the test pressure range. This will validate the MFIV performance curve (on which the curve of Figure 3.7.3-1 is based) under actual plant conditions (using only a single actuation train to stroke each MFIV). This baseline testing will be completed prior to implementation of the requested amendment.

Completion of the baseline testing described above is considered to be a commitment. Therefore, this commitment is identified and included in the list of commitments provided in Attachment 5.

CONCLUSION

Based on the above discussions, an increase in the MFIV stroke time from 15 seconds to a higher bounding stroke time value of 90 seconds, based on plant conditions, is acceptable with respect to the applicable accident analyses. Supported by this conclusion for the accident analyses and based on the MFIV Performance Curve provided as Attachment 6, conservative acceptance criteria for the pressure-dependent MFIV stroke time were developed (in the form of a curve) to ensure that the MFIVs will close within the time frame assumed in the accident analyses. Proposed TS Figure 3.7.3-1 is the resulting acceptance curve for the MFIV stroke time limit.

5.0 REGULATORY SAFETY ANALYSIS

This section addresses the standards of 10CFR50.92 as well as the applicable regulatory requirements and acceptance criteria.

5.1 No Significant Hazards Consideration (NSHC)

This license amendment request proposes to change the Technical Specifications to add a surveillance requirement that incorporates an MFIV stroke time limit that is dependent upon system pressure, for all applicable operating Modes. The change to delete the Notes on SR 3.7.3.1 and SR 3.7.3.2 are incidental to the stroke time change since the new limit can clearly be applied to all applicable Modes, thus making the Notes no longer necessary. The proposed changes do not involve a significant hazards consideration for Callaway Plant based on the three standards set forth in 10CFR50.92(c) as discussed below:

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

Response: No.

Revision of the MFIV stroke time limit has no impact on the frequency of occurrence of those events for which feedwater isolation is credited or assumed. The MFIVs themselves are not part of the initiating mechanisms or failure modes for such events (such as steamline break or feedwater line break). Therefore, the proposed change has no impact on the probability of occurrence of such events and does not involve a significant increase in the probability of an accident previously evaluated.

With regard to consequences of previously evaluated accidents, evaluations were documented in References 7.1, 7.2, and 7.3 that assessed the impact of the change in MFIV actuators and an associated 15-second MFIV stroke time (for operating conditions that include secondary system pressures above the reference pressure that corresponds to P-11 permissive) on LOCA mass and energy releases; main steamline break mass and energy releases; LOCA and LOCA related transients; non-LOCA transients; LOCA hydraulic forces and steam releases used for radiological consequence calculations. The consequences of those evaluations are not adversely affected by the proposed change to an increasing MFIV stroke time limit where appropriate for lower secondary system pressures. The evaluations discussed in Section 4.0 demonstrate that such an increase in the MFIV stroke time from the 15 seconds assumed in the analyses performed in support of the Callaway RSG Program (Reference 7.3) to a higher bounding stroke time value of 90 seconds where appropriate for lower secondary system pressures is acceptable with respect to the impacted accident analyses. The resulting interpolated TS curve proposed as TS Figure 3.7.3-1 provides an MFIV stroke time limit that is pressure dependent but bounding, as it ensures the applicable FSAR Chapter 15 events that credit MFIV closure remain bounding.

Therefore, the proposed change does not result in a significant increase in the probability or consequences of an accident previously evaluated.

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

Response: No.

The proposed changes do not involve any hardware or design changes or any changes in the methods by which safety-related plant systems perform their safety function. No new accident scenarios, transient precursors, failure mechanisms, or limiting single failures are introduced as a result of this request. There will be no adverse effect or challenges imposed on any safety-related system as a result of the proposed change.

Therefore, the proposed change does not create a new or different kind of accident from any accident previously evaluated.

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

Response: No.

The proposed changes to incorporate a pressure-dependent MFIV surveillance stroke time limit and to delete the Notes on SR 3.7.3.1 and SR 3.7.3.2 do not affect any safety analysis acceptance criteria nor involve any change to a safety analysis limit, limiting safety system setting, or safety system performance criterion. There will be no effect on the manner in which safety limits or limiting safety system settings are determined nor will there be any effect on those plant systems necessary to assure the accomplishment of protection functions. The radiological dose consequence acceptance criteria will continue to be met. There will be no significant impact on the overpower limit, departure from nucleate boiling ratio limits, heat flux hot channel factor (F_Q), nuclear enthalpy rise hot channel factor (F-delta-H), loss of coolant accident peak cladding temperature (LOCA PCT), peak local power density, or any other margin of safety. The radiological dose consequence acceptance criteria listed in the Standard Review Plan will continue to be met.

Therefore, the proposed change does not involve a significant reduction in the margin of safety.

Conclusion

Based on the above evaluations, AmerenUE concludes that the activities associated with the changes described above present no significant hazards consideration under the standards set forth in 10 CFR 50.92 and accordingly, a finding by the NRC of no significant hazards consideration is justified.

5.2 Applicable Regulatory Requirements/Criteria

The basis for TS 3.7.3, "Main Feedwater Isolation Valves (MFIVs)", is the isolation of main feedwater (MFW) flow to the secondary side of the steam generators following a secondary side pipe break. Closure of the MFIVs terminates flow to the steam generators, terminating the event for feedwater line breaks (FLBs) occurring upstream of the MFIVs. Closure of the MFIVs effectively terminates the addition of feedwater to an affected steam generator, limiting the mass and energy release for steam line breaks (SLBs) or FLBs inside containment and reducing the cooldown effects for SLBs. For FLBs inside containment or SLBs, isolation of main feedwater limits the high energy fluid to the broken loop and provides a path for the addition of auxiliary feedwater to the intact steam generators.

The regulatory bases and guidance documents that support or may be associated with the above basis include:

General Design Criteria (GDC) 2, "Design Bases for Protection against Natural Phenomena," requires that the safety-related portion of the feedwater system be protected from the effects of natural phenomena, such as earthquakes, tornadoes, hurricanes, floods, and external missiles.

GDC 3, "Fire Protection," and GDC 4, "Environmental and Dynamic Effects Design Bases," requires that the safety-related portion of the feedwater system be designed to remain functional after a safe shutdown earthquake (SSE), and to perform its intended function following postulated hazards of fire, internal missiles, or pipe break.

GDC 34, "Residual Heat Removal," requires ensuring that safety functions of the feedwater system can be performed assuming a single active component failure coincident with the loss of offsite power. Per the Callaway FSAR, compliance with GDC 34 requires that for a main feedwater line break upstream of the MFIVs (outside containment), the feedwater system is designed to prevent the blowdown of any one steam generator and to provide a path for the addition of auxiliary feedwater for reactor cooldown under emergency shutdown conditions.

There are no changes being proposed such that compliance with any of the regulatory requirements and commitments above would come into question. The evaluations documented above confirm that Callaway Plant will continue to comply with all applicable regulatory requirements.

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

6.0 ENVIRONMENTAL CONSIDERATION

AmerenUE has determined that the proposed amendment would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. AmerenUE has evaluated the proposed changes and has determined that the changes do not involve (i) a significant hazards consideration, (ii) a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure.

As discussed above, the proposed changes do not involve a significant hazards consideration and the analysis demonstrates that the consequences from the postulated accidents are well within the 10 CFR 100 limits. Accordingly, the proposed changes meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

7.0 REFERENCES

7.1 ULNRC-04592, dated June 27, 2003, Proposed Revision to Technical Specification 1.1, "Definitions"; Technical Specification 3.7.3, "Main Feedwater Isolation Valves (MFIVs)"; and Steam Generator Tube Rupture With Overfill Re-Analysis.

7.2 ULNRC-04928, dated December 12, 2003, Responses to Requests for Additional Information, Proposed Revision to Technical Specification 1.1, "Definitions"; Technical Specification 3.7.3, "Main Feedwater Isolation Valves (MFIVs)"; and Steam Generator Tube Rupture With Overfill Re-Analysis.

7.3 ULNRC-05056, dated September 17, 2004, Technical Specification Revisions Associated with the Steam Generator Replacement Project C654.

7.4 ULNRC-05071 dated October 27, 2004, Proposed Revisions to Technical Specification 3.7.3, "Main Feedwater Isolation Valves (MFIVs)" To Add The Main Feedwater Regulating Valves (MFRVs) and MFRV Bypass Valves (MFRVBVs) and To Extend the MFIV Allowed Outage Time.

7.5 WCAP-8822 (Proprietary) and WCAP-8860 (Nonproprietary), Mass and Energy Releases Following a Steam Line Rupture, September 1976; WCAP-8822-S1-P-A (Proprietary) and WCAP-8860-S1-A (Nonproprietary), Supplement 1 – Calculations of Steam Superheat in Mass/Energy Releases Following a Steam Line Rupture, September 1986; WCAP-8822-S2-P-A (Proprietary) and WCAP-8860-S2-A (Nonproprietary), Supplement 2 – Impact of Steam Superheat in Mass/Energy Releases Following a Steam Line Rupture for Dry and Subatmospheric Containment Designs, September 1986

7.6 Hollingsworth, S.D. and Wood, D. C., "Reactor Core Response to Excessive Secondary Steam Releases," WCAP-9226, Revision 1,)Proprietary), January 1978, and WCAP-9227, Revision 1, (Non-Proprietary), January 1978.

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ATTACHMENT 2

MARKUP OF TECHNICAL SPECIFICATION PAGES

FOR INFORMATION ONLY

3.7 PLANT SYSTEMS

3.7.3 Main Feedwater Isolation Valves (MFIVs) and Main Feedwater Regulating Valves (MFRVs) and Main Feedwater Regulating Valve Bypass Valves (MFRVBVs)

LCO 3.7.3 Four MFIVs, four MFRVs, and four MFRVBVs shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3 except when:

a. MFIV is closed and de-activated; or
b. MFRV is closed and de-activated or closed and isolated by a closed manual valve; or
c. MFRVBV is closed and de-activated, or closed and isolated by a closed manual valve, or isolated by two closed manual valves.

ACTIONS

---NOTE---
Separate Condition entry is allowed for each valve.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more MFIVs inoperable.	A.1	Close MFIV.	72 hours
	<u>AND</u>		
	A.2	Verify MFIV is closed.	Once per 7 days
B. One or more MFRVs inoperable.	B.1	Close or isolate MFRV.	72 hours
	<u>AND</u>		
	B.2	Verify MFRV is closed or isolated.	Once per 7 days
C. One or more MFRVBVs inoperable.	C.1	Close or isolate bypass valve.	72 hours
	<u>AND</u>		
	C.2	Verify bypass valve is closed or isolated.	Once per 7 days

(continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Two valves in the same flow path inoperable	D.1	Isolate affected flow path.	8 hours
E. Required Action and associated Completion Time not met.	E.1	Be in MODE 3.	6 hours
	AND		
	E.2	Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	~~-------NOTE-------~~ ~~Only required to be performed in MODES 1 and 2.~~ ~~---------------------~~ Verify the closure time of each MFIV, MFRV and MFRVBV is ≤ 15 seconds.	In accordance with the Inservice Testing Program
SR 3.7.3.2	~~-------NOTE-------~~ ~~Only required to be performed in MODES 1 and 2.~~ ~~---------------------~~ Verify each MFIV, MFRV and MFRVBV actuates to the isolation position on an actual or simulated actuation signal.	18 months

INSERT A

OL 1258

INSERT A

SR 3.7.3.3	Verify the closure time of each MFIV is within the limits of Figure 3.7.3-1.	In accordance with the Inservice Testing Program

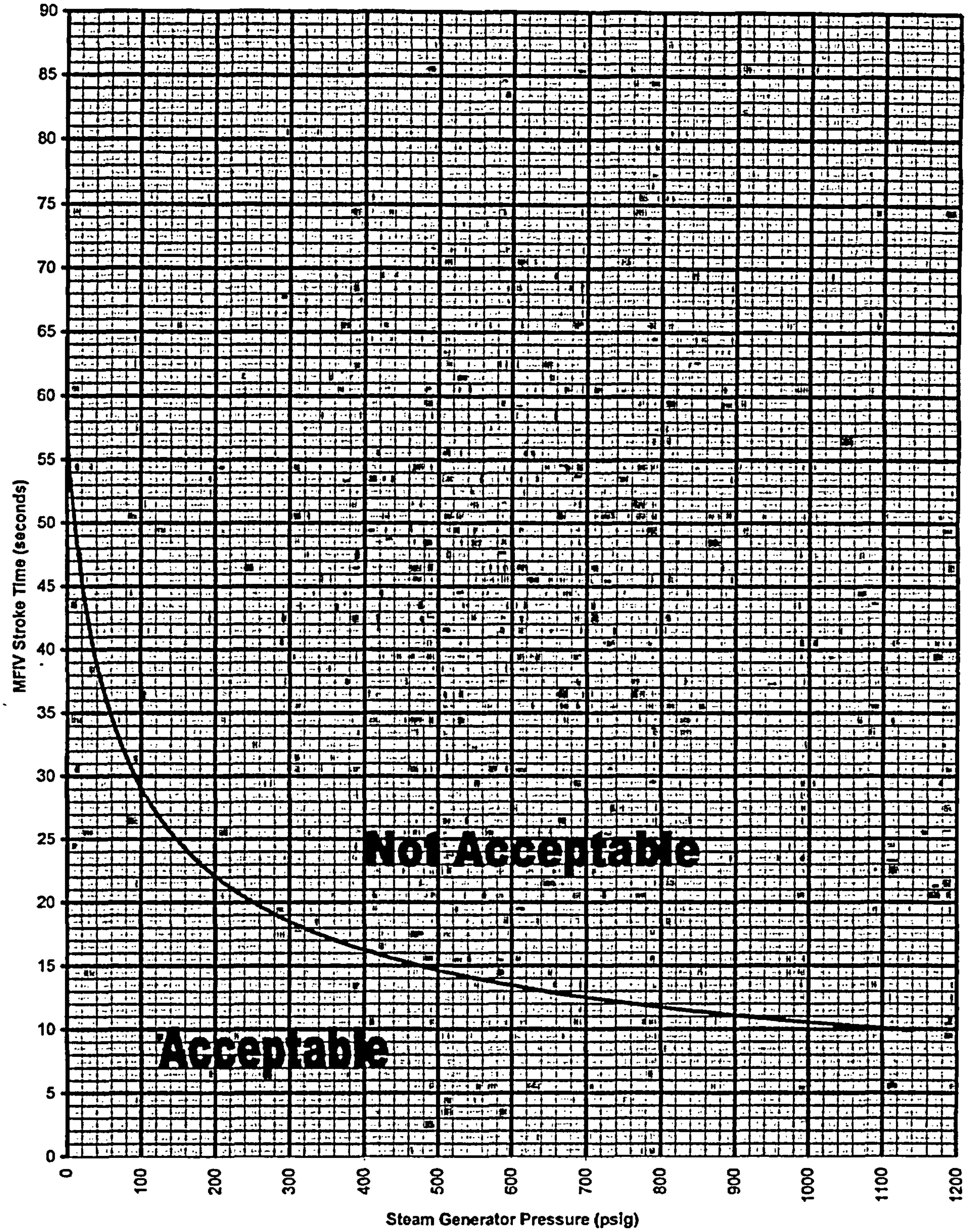

Figure 3.7.3-1 (Page 1 of 1)
MFIV Stroke Time Limit vs Steam Generator Pressure

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ATTACHMENT 3

RETYPED TECHNICAL SPECIFICATION PAGES
(Later)

ULNRC- 05206

ATTACHMENT 4

PROPOSED TECHNICAL SPECIFICATION BASES CHANGES

(for information only)

B 3.7 PLANT SYSTEMS

B 3.7.3 Main Feedwater Isolation Valves (MFIVs) and Main Feedwater Regulating Valves (MFRVs) and Main Feedwater Regulating Valve Bypass Valves (MFRVBVs)

BASES

BACKGROUND

The MFIVs isolate main feedwater (MFW) flow to the secondary side of the steam generators following a high energy line break (HELB). The MFRVs and MFRVBVs function to control feedwater flow to the SGs and provide backup isolation of MFW flow in the event an MFIV fails to close. Because an earthquake is not assumed to occur coincident with a spontaneous break of safety related secondary piping, loss of the non-safety grade MFRVs and MFRVBVs is not assumed. If the single active failure postulated for a secondary pipe break is the failure of a safety grade MFIV to close, then credit is taken for closing the non-safety grade MFRVs and MFRVBVs.

INSERT 1

The MFIV is a 14-inch gate valve with a system-medium actuator. The assumed single active failure of one of the redundant MFIV actuation trains will not prevent the MFIV from closing.

Closure of the MFIVs or MFRVs and MFRVBVs terminates flow to the steam generators, terminating the event for feedwater line breaks (FWLBs) occurring upstream of the MFIVs or MFRVs and MFRVBVs. The consequences of events occurring in the main steam lines or in the MFW lines downstream from the MFIVs will be mitigated by their closure. Closure of the MFIVs or MFRVs and MFRVBVs effectively terminates the addition of feedwater to an affected steam generator, limiting the mass and energy release for steam line breaks (SLBs) or FWLBs inside containment, and reducing the cooldown effects for SLBs.

The MFIVs isolate the nonsafety related portions from the safety related portions of the system. In the event of a secondary side pipe rupture inside containment, the valves limit the quantity of high energy fluid that enters containment through the break, and provide a pressure boundary for the controlled addition of auxiliary feedwater (AFW) to the intact loops.

One MFIV and one MFRV are located on each MFW line, outside but close to containment. The MFRV Bypass valves are located in six inch lines that bypass flow around the MFRVs during low power operation. As shown in Reference 6, an MFIV cannot be isolated with closed manual valves; the MFRV can be isolated upstream by a closed manual valve; and the MFRVBV can be isolated both upstream and downstream with a closed manual valve. The MFIVs and MFRVs and MFRVBVs are located upstream of the AFW injection point so that AFW may be supplied to the steam generators following MFIV or MFRV and MFRVBV closure. The piping volume from these valves to the steam generators is accounted for

(continued)

INSERT 1

Since the MFIV actuators are system-medium actuators, the MFIV isolation time is a function of system pressure.

BASES

BACKGROUND (continued)

in calculating mass and energy releases, and purged and refilled prior to AFW reaching the steam generator following either an SLB or FWLB.

The MFIVs and MFRVs and MFRVBVs close on receipt of any safety injection signal, a T_{avg} - Low coincident with reactor trip (P-4), a low-low steam generator level, or steam generator water level - high high signal. MFIVs may also be actuated manually. In addition to the MFIVs and MFRVs and MFRVBVs a check valve inside containment is available. The check valve isolates the feedwater line penetrating containment and ensures the pressure boundary of any intact loop not receiving auxiliary feedwater.

The MFIV actuators consist of two separate system-medium actuation trains each receiving an actuation signal from one of the redundant ESFAS channels. A single active failure in one power train would not prevent the other power train from functioning. The MFIVs provide the primary success path for events requiring feedwater isolation and isolation of non-safety-related portions from the safety-related portion of the system, such as, for auxiliary feedwater addition.

The MFRV and MFRVBV actuators consist of two separate actuation trains each receiving an actuation signal from one of the redundant ESFAS channels. Both trains are required to actuate to close the valve.

A description of the MFIVs and MFRVs and MFRVBVs is found in the FSAR, Section 10.4.7 (Ref. 1).

APPLICABLE SAFETY ANALYSES

Credit is taken in accident analysis for the MFIVs to close on demand. The function of the MFRVs and associated bypass valves as discussed in the accident analysis is to provide a diverse backup function to the MFIVs for the potential failure of an MFIV to close even though the MFRVs are located in the non-safety-related portion of the feedwater system. Further assurance of feedwater flow termination is provided by the SGFP trip function; however, SGFP trip is not credited in accident analysis. The accident analysis credits the main feedwater check valves as backup to the MFIVs to prevent SG blowdown for pipe ruptures in the non-seismic Category I portions of the feedwater system outside containment.

INSERT 2

Criterion 3 of 10 CFR 50.36(c)(2)(ii) indicates that components that are part of the primary success path and that actuate to mitigate an event that presents a challenge to a fission product barrier should be in Technical Specifications. The primary success path of a safety analysis consists of the combination and sequences of equipment needed to operate (including redundant trains/components) so that the plant response to the event remains within appropriate acceptance criteria. The primary success path does not include backup and diverse equipment. The

(continued)

INSERT 2

The impact of an MFIV isolation time as a function of system pressure on the safety analyses has been evaluated in References 2 and 7. The evaluation concluded that a variable MFIV isolation time is acceptable with respect to the safety analyses. Figure 3.7.3-1 is a curve of the MFIV isolation time limit as a function of system pressure. Meeting the MFIV isolation times in Figure 3.7.3-1 ensures that the evaluations performed in References 2 and 7 remain valid.

BASES

APPLICABLE SAFETY ANALYSES (continued)

MFIVs, with their dual-redundant actuation trains, are the primary success path for feedwater isolation. The MFIVs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii). The MFRVs and MFRVBVs are backup and diverse equipment. The MFRVs and MFRVBVs satisfy Criterion 4 of 10 CFR 50.36(c)(2)(ii).

LCO

This LCO ensures that the MFIVs and MFRVs and MFRVBVs will isolate MFW flow to the steam generators, following an FWLB or main steam line break. The MFIVs will also isolate the nonsafety related portions from the safety related portions of the system.

This LCO requires that four MFIVs and four MFRVs and four MFRVBVs be OPERABLE. The ~~MFIVs and~~ MFRVs and MFRVBVs are considered OPERABLE when isolation times are within limits when given an isolation actuation signal and they are capable of closing on an isolation actuation signal. INSERT 3 For the MFRVs and MFRVBVs, the LCO requires only that the trip close function is OPERABLE. No OPERABILITY requirements are imposed on the analog controls shown on Reference 5.

Failure to meet the LCO requirements can result in additional mass and energy being released to containment following an SLB or FWLB inside containment. A feedwater isolation signal on high steam generator level is relied on to terminate an excess feedwater flow event.

APPLICABILITY

The MFIVs and MFRVs and MFRVBVs must be OPERABLE whenever there is significant mass and energy in the Reactor Coolant System and steam generators. This ensures that, in the event of an HELB, a single failure cannot result in the blowdown of more than one steam generator. In MODES 1, 2, and 3, the MFIVs and MFRVs and MFRVBVs are required to be OPERABLE to limit the amount of available fluid that could be added to containment in the case of a secondary system pipe break inside containment.

Exceptions to the APPLICABILITY are allowed for the following cases where the valve is assured of performing its safety function (Reference 6):

a. When the MFIV is closed and de-activated, it is performing its safety function. Requiring the valve closed and de-activated provides dual assurance that it is performing its safety function. When the valve is de-activated, power is removed from the actuation solenoids on the valves.

b. When the MFRV is closed and de-activated or is closed and isolated by a closed manual valve, it is performing its safety function.

(continued)

INSERT 3

The MFIVs are considered OPERABLE when isolation times are within the limits of Figure 3.7.3-1 when given a fast close signal and they are capable of closing on an isolation actuation signal.

NO CHANGES
For Information Only

APPLICABILITY (continued)

Requiring the valve closed and de-activated provides dual assurance that it is performing its safety function. When the valve is de-activated, power is removed from the actuation solenoids on the valves. Requiring the valve closed and isolated by a closed manual valve also provides dual assurance that it is performing its safety function.

c. When the MFRVBV is closed and de-activated, or is closed and isolated by a closed manual valve, or is isolated by two closed manual valves, it is performing its safety function. Requiring the valve closed and de-activated provides dual assurance that is performing its safety function. When the valve is de-activated, power is removed from the actuation solenoids on the valves. Requiring the valve closed and isolated by a closed manual valve also provides dual assurance that it is performing its safety function. Finally, there is dual assurance that the safety function is being performed when the MFRVBV is isolated by two closed manual valves.

In MODES 4, 5, and 6, steam generator energy is low. Therefore, the MFIVs and MFRVs and MFRVBVs are not required to mitigate the effects of a feedwater or steamline break in these MODES.

ACTIONS

The ACTIONS table is modified by a Note indicating that separate Condition entry is allowed for each valve.

A.1 and A.2

With one MFIV in one or more flow paths inoperable, action must be taken to restore the affected valves to OPERABLE status, or to close inoperable affected valves within 72 hours. When these valves are closed, they are performing their required safety function.

The 72 hour Completion Time takes into account the redundancy afforded by the dual-redundant actuation trains on the MFIVs, the redundancy afforded by the remaining OPERABLE valves, and the low probability of an event occurring during this time period that would require isolation of the MFW flow paths. The 72 hour Completion Time is reasonable, based on operating experience.

Inoperable MFIVs that are closed must be verified on a periodic basis that they are closed. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve status indications

(continued)

NO CHANGES
FOR INFORMATION ONLY

BASES

ACTIONS

A.1 and A.2 (continued)

available in the control room, and other administrative controls, to ensure that these valves are closed.

If the MFIVs are closed and de-activated, this LCO does not apply as discussed in the Applicability section of these Bases.

B.1 and B.2

With one MFRV in one or more flow paths inoperable, action must be taken to restore the affected valves to OPERABLE status, or to close or to isolate inoperable affected valves within 72 hours. When these valves are closed or isolated, they are performing their required safety function.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves and the low probability of an event occurring during this time period that would require isolation of the MFW flow paths. The 72 hour Completion Time is reasonable, based on operating experience.

Inoperable MFRVs, that are closed or isolated, must be verified on a periodic basis that they are closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls to ensure that the valves are closed or isolated. If the MFRVs are closed and de-activated, or closed and isolated by a closed manual valve, this LCO does not apply as discussed in the Applicability section of these Bases.

C.1 and C.2

With one MFRVBV in one or more flow paths inoperable, action must be taken to restore the affected valves to OPERABLE status, or to close or to isolate inoperable affected valves with 72 hours. When these valves are closed or isolated, they are performing their required safety function.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves and the low probability of an event occurring during this time period that would require isolation of the MFW flow paths. The 72 hour Completion Time is reasonable, based on operating experience.

(continued)

NO CHANGES,
FOR INFORMATION ONLY

ACTIONS

C.1 and C.2 (continued)

Inoperable MFRVBVs that are closed or isolated must be verified on a periodic basis that they are closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls, to ensure that these valves are closed or isolated.

If the MFRVBVs are closed and de-activated, or closed and isolated by a closed manual valve, or isolated by two closed manual valves, this LCO does not apply as discussed in the Applicability section of these Bases.

D.1

Two inoperable valves in the same flow path is treated the same as loss of the isolation capability of this flow path. For each feedwater line there are two flow paths, defined as flow through the MFRV/MFIV and flow through the MFRVBV/MFIV. Because the MFIV, MFRV, and MFRVBV are of different designs, a common mode failure of the valves in the same flow path is not likely. However, under these conditions, affected valves in each flow path must be restored to OPERABLE status, or the affected flow path isolated within 8 hours. This action returns the system to the condition where at least one valve in each flow path is performing the required safety function. The 8 hour Completion Time is reasonable, based on operating experience, to complete the actions required to close the MFIV or MFRV and MFRVBV, or otherwise isolate the affected flow path.

E.1 and E.2

If the MFIV(s) and MFRV(s) and MFRVBV(s) cannot be restored to OPERABLE status, or closed, within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.7.3.1

This SR verifies that the closure time of each MFIV, MFRV, and MFRVBV is ≤ 15 seconds from each actuation train when tested pursuant to the Inservice Testing Program. The ~~MFIV and~~ MFRV and MFRVBV closure time is assumed in the accident and containment analyses. This Surveillance is normally performed upon returning the unit to operation following a refueling outage. The ~~MFIVs and~~ MFRVs should not be tested at power since even a partial stroke exercise increases the risk of a valve closure with the unit generating power.

The Frequency for this SR is in accordance with the Inservice Testing Program. Per Reference 4, if it is necessary to adjust steam packing to stop packing leakage and if a required stroke test is not practical in the current plant MODE, it should be shown by analysis that the packing adjustment is within torque limits specified by the manufacturer for the existing configuration of packing, and that the performance parameters of the valve are not adversely affected. A confirmatory test must be performed at the first available opportunity when plant conditions allow testing. Packing adjustments beyond the manufacturer's limits may not be performed without (1) an engineering analysis and (2) input from the manufacturer, unless tests can be performed after adjustments.

~~This test is conducted in MODE 3 with the unit at nominal operating temperature and pressure, as discussed in Reference 2. This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. This allows a delay of testing until MODE 3, to establish conditions consistent with those under which the acceptance criterion was generated.~~

SR 3.7.3.2

This SR verifies that each MFIV and MFRV and MFRVBV is capable of closure on an actual or simulated actuation signal. For the MFIVs the manual fast close handswitch in the Control Room provides an acceptable actuation signal. Each actuation train must be tested separately. For the MFRVs and the MFRVBVs, actuation of solenoids locally at the MFRVs and MFRVBVs constitutes an acceptable simulated actuation signal. This Surveillance is normally performed upon returning the unit to operation following a refueling outage in conjunction with SR 3.7.3.1. However, it is acceptable to perform this surveillance individually.

The frequency of MFIV and MFRV and MFRVBV testing is every 18 months. The 18 month Frequency for testing is based on the refueling

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.3.2 (continued)

cycle. This Frequency is acceptable from a reliability standpoint. ~~This SR is modified by a NOTE that allows entry into and operation in MODE 3 prior to performing the SR.~~

~~This allows a delay of testing until MODE 3, to establish conditions consistent with those necessary to perform SR 3.7.3.1 and SR 3.7.3.2 concurrently.~~

INSERT 4

REFERENCES

1. FSAR, Section 10.4.7, Condensate and Feedwater System.

INSERT 5

2. ~~ASME, Boiler and Pressure Vessel Code, Section XI.~~

3. FSAR, Table 7.3-14, NSSS Instrument Operating Conditions for Isolation Functions.

4. NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants."

5. FSAR Figure 7.2-1, Sheets 13 and 14.

6. FSAR Figure 10.4-6, Sheets 1 and 2.

7. WCAP-16265-P, dated August 2004.

INSERT 4

SR 3.7.3.3

This SR verifies that the closure time of each MFIV is within the limits of Figure 3.7.3-1 from each actuation train when tested pursuant to the Inservice Testing Program. The MFIV closure time is assumed in the accident and containment analyses. Figure 3.7.3-1 is a curve of the MFIV isolation time limit as a function of system pressure. There is no pressure indication available at the MFIVs. Therefore, the acceptance curve for stroke time uses steam generator pressure and the acceptance curve has been modified accordingly to conservatively account for the potential pressure differential between the steam generator pressure indication and the pressure at the MFIVs. Meeting the MFIV isolation times in Figure 3.7.3-1 ensures that the evaluations performed in Reference 2 and Reference 7 remains valid. This Surveillance is normally performed upon returning the unit to operation following a refueling outage. These valves should not be tested at power since even a part stroke exercise increases the risk of a valve closure with the unit generating power.

The Frequency for this SR is in accordance with the Inservice Testing Program. Per Reference 4, if it is necessary to adjust stem packing to stop packing leakage and if a required stroke test is not practical in the current plant MODE, it should be shown by analysis that the packing adjustment is within torque limits specified by the manufacturer for the existing configuration of packing, and that the performance parameters of the valve are not adversely affected. A confirmatory test must be performed at the first available opportunity when plant conditions allow testing. Packing adjustments beyond the manufacturer's limits may not be performed without (1) an engineering analysis and (2) input from the manufacturer, unless tests can be performed after adjustments.

INSERT 5

Westinghouse Letter, SCP-05-027, Revision 1, dated May 12, 2005.

ULNRC- 05206

ATTACHMENT 5

SUMMARY OF REGULATORY COMMITMENTS

SUMMARY OF REGULATORY COMMITMENTS

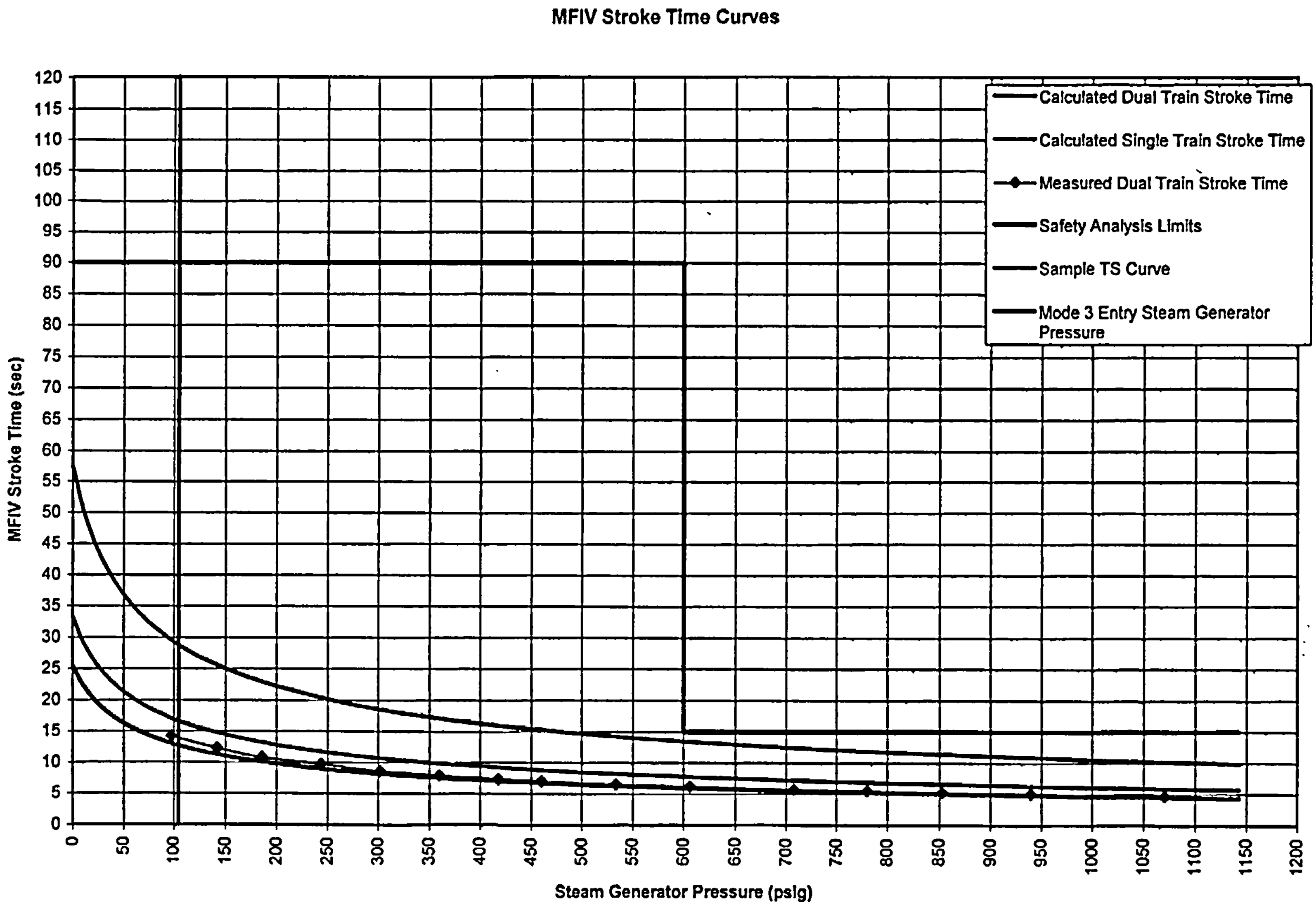
The following table identifies those actions committed to by AmerenUE, Callaway Plant in this document. Any other statements in this submittal are provided for information purposes and are not considered to be commitments. Please direct questions regarding these commitments to Mr. Dave E. Shafer, Superintendent,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

COMMITMENT	Due Date/Event
The approved amendment will be implemented no later than MODE 3 entry (ascending) during startup from the Refuel 15 Outage.	No later than MODE 3 entry (ascending) during startup from the Refuel 15 outage
The associated FSAR and TS Bases revisions, as approved by plant review programs performed under 10 CFR 50.59, 10 CFR 50.71(e), and TS 5.5, will be incorporated into the next licensing document regulatory update.	6 months following the end of Refuel 15
AmerenUE will perform stroke-time "baseline" testing of the MFIVs at several pressure values over the test pressure range.	Prior to implementation of the requested amendment.

ULNRC- 05206

ATTACHMENT 6

MFIV PERFORMANCE CURVE


MFIV Stroke Time Curves
MFIV Stroke Time (sec)
Steam Generator Pressure (psig)
Calculated Dual Train Stroke Time
Calculated Single Train Stroke Time
Measured Dual Train Stroke Time
Safety Analysis Limits
Sample TS Curve
Mode 3 Entry Steam Generator Pressure
0
5
10
15
20
25
30
35
40
45
50
55
60
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