

May 26, 2005

U.S. Nuclear Regulatory Commission  
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Ladies and Gentlemen:

ULNRC- 05150



**DOCKET NUMBER 50-483  
CALLAWAY PLANT  
UNION ELECTRIC COMPANY  
LICENSE AMENDMENT REQUEST OL-1262  
REVISION TO TECHNICAL SPECIFICATION (TS) 3.7.2,  
"MAIN STEAM ISOLATION VALVES (MSIVs)," TO ADD  
CONDITIONS FOR INOPERABLE MSIV ACTUATOR TRAINS**

Pursuant to 10 CFR 50.90, AmerenUE (Union Electric) hereby requests an amendment to the Facility Operating License No. NPF-30 for the Callaway Plant. Specifically, AmerenUE proposes to incorporate the attached changes into Technical Specification 3.7.2, "Main Steam Isolation Valves (MSIVs)." The changes are needed to incorporate Conditions, Required Actions, and Completion Times specifically for inoperable actuator trains associated with the MSIVs. These changes are considered to be needed as additional requirements over those currently contained in TS 3.7.2 and are being submitted under the guidance of Administrative Letter 98-10.

At Callaway one MSIV is installed in each of the four main steam lines outside the containment and downstream of the safety valves. The MSIVs prevent uncontrolled blowdown from more than one steam generator in the event of a postulated design basis accident. Each MSIV is equipped with dual-redundant actuator trains such that either actuator train can effect closure of its associated MSIV on demand. This amendment application revises Technical Specification 3.7.2, "Main Steam Isolation Valves (MSIVs)," to add new Conditions, Required Actions and associated Completion Times specifically for the MSIV actuator trains. Current TS 3.7.2 Conditions and Required Actions for the MSIVs themselves remain unchanged, but are relabeled due to the change in order.

Necessary information is provided in the attachments to this letter. Attachment 1 is the required Affidavit. Attachment 2 provides a detailed description and safety analysis of the proposed changes, including the Callaway determination that the proposed changes do not involve a significant hazards consideration.

A001

Attachment 3 provides the existing Technical Specification pages marked-up to show the proposed changes, and Attachment 4 provides a "clean" copy of the affected Technical Specification pages with the proposed changes incorporated (if approved as proposed). Attachment 5 provides the existing Technical Specification Bases pages marked-up to show the proposed changes (for information only).


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 included in this submittal is provided in Attachment 6.

With regard to applicable regulatory requirements, and as indicated in Attachment 2, the proposed Technical Specification changes have been evaluated pursuant to 10 CFR 50.92, and it has been determined that this amendment application does not involve a significant hazards consideration. In addition, evaluation of the changes pursuant to 10 CFR 51.22(b) has determined that no environmental assessment needs to be prepared in connection with the issuance of this amendment. Finally, it may be noted that pursuant to 10 CFR 50.91(b)(1), AmerenUE is providing the State of Missouri with a copy of this proposed amendment.

AmerenUE requests review and approval of this proposed License Amendment on an expedited basis to address questions raised concerning the treatment of MSIV actuator trains with regard to MSIV operability. The approved amendment will be implemented within 90 days of approval.

If you should have any questions on the above or attached, please contact Dave Shafer at (314) 554-3104 or Dwyla Walker at (314) 554-2126.

Very truly yours,



Keith D. Young  
Manager, Regulatory Affairs

DJW/jdg

- Attachments:
- 1) Affidavit
  - 2) Evaluation
  - 3) Markup of Technical Specification Pages
  - 4) Retyped Technical Specification Pages
  - 5) Proposed Technical Specification Bases Changes  
(for information only)
  - 6) Summary of Regulatory Commitments

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STATE OF MISSOURI     )  
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Keith D. Young of lawful age, being first duly sworn upon oath says that he is Manager - Regulatory Affairs, for Union Electric Company; that he has read the foregoing document and knows the content thereof; that he has executed the same for and on behalf of said company with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By *Keith D. Young*  
          Keith D. Young  
          Manager, Regulatory Affairs

SUBSCRIBED and sworn to before me this 26<sup>th</sup> day of May, 2005



*Cathy J. Crisp*  
Notary Public  
State of Missouri  
Expiration 1-29-06

**ATTACHMENT 2**  
**EVALUATION**

**PROPOSED REVISION TO TECHNICAL SPECIFICATION 3.7.2,  
"MAIN STEAM ISOLATION VALVES (MSIVs)," TO ADD  
CONDITIONS FOR INOPERABLE MSIV ACTUATOR TRAINS**

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## EVALUATION

### 1.0 DESCRIPTION

AmerenUE requests amendment of Operating License NPF-30 for the Callaway Plant to incorporate changes to Technical Specification (TS) 3.7.2, "Main Steam Isolation Valves (MSIVs)." Revisions to TS 3.7.2 are needed to incorporate Conditions, Required Actions, and Completion Times specifically for the MSIV actuator trains. These changes are considered as adding additional requirements over those currently contained in TS 3.7.2 and are being submitted under the guidance of Administrative Letter 98-10.

### 2.0 PROPOSED CHANGES

At Callaway one MSIV is installed in each of the four main steam lines outside the containment and downstream of the safety valves. The MSIVs prevent uncontrolled blowdown from more than one steam generator in the event of a postulated design basis accident. Each MSIV is equipped with dual-redundant actuator trains such that either actuator train can effect closure of its associated MSIV on demand.

TS 3.7.2, "Main Steam Isolation Valves (MSIVs)," specifies operability and test requirements for the MSIVs, and includes Conditions and Required Actions to be entered when one or more MSIVs are declared inoperable. It does not specifically address or provide specific requirements for the MSIV actuator trains. Inoperability of one of the two actuator trains associated with an MSIV does not by itself make the MSIV incapable of closing since the remaining operable actuator train can alone effect valve closure on demand. Declaring an MSIV(s) inoperable and having to enter the Condition(s) and Required Action(s) due only to an inoperable actuator train(s), is unnecessarily restrictive. Therefore, AmerenUE proposes to incorporate requirements particularly for the MSIV actuator trains within TS 3.7.2 such that TS 3.7.2 would include Conditions and Required Actions to address inoperable MSIV actuator trains.

Specifically, the changes proposed for TS 3.7.2 would add new Conditions A through E (to address inoperable MSIV actuator trains) and relabel the existing Conditions (that address inoperable MSIVs) such that those Conditions would become Conditions F through I. The proposed, new Conditions related specifically to the MSIV actuator trains would address various degrees or combinations of inoperable MSIV actuator trains, as follows:

- New Condition A would address the condition of having one MSIV actuator train inoperable (for a single MSIV). The proposed Required Action for this Condition would require restoring the inoperable MSIV actuator train to OPERABLE status within 72 hours.

- New Condition B would address the condition of having two MSIV actuator trains inoperable for different MSIVs (i.e., one actuator inoperable for each of two MSIVs) such that the actuator trains are not in the same separation group. The proposed Required Action for this Condition would require restoring at least one MSIV actuator train to OPERABLE status within 24 hours.
- New Condition C would address the situation when two MSIV actuator trains are inoperable (for different MSIVs) and the inoperable actuator trains are both in the same separation group. The proposed Required Action for this Condition would require restoring at least one MSIV actuator train to OPERABLE status within 4 hours.
- New Condition D would address the situation when both actuator trains for one MSIV are inoperable. The Required Action proposed for this Condition would require immediately declaring the affected MSIV inoperable.
- New Condition E would address the condition of having three or more MSIV actuator trains inoperable, OR the condition when, after entering Conditions A, B or C, it is determined that the Required Action and Completion Time of any of those Conditions cannot be met. The Required Action for this Condition would require immediately declaring each affected MSIV inoperable.

In light of the fact that TS 3.7.2 would provide Conditions and Required Actions for the MSIV actuator trains apart from or in addition to Conditions and Required Actions for the MSIVs themselves, it was determined that the Limiting Condition for Operation (LCO) statement in this Technical Specification should be revised to address the MSIVs and their associated actuator trains. Therefore, the LCO statement would specifically be revised to read, "The MSIVs and their associated actuator trains shall be OPERABLE."

Appropriate changes to the Technical Specification Bases will also be made, and are also attached (in the form of marked-up pages from the applicable TS Bases sections). The TS Bases changes are provided for information only, and are to be implemented pursuant to the TS Bases Control Program, TS 5.5.14, after NRC approval of the amendment.

### **3.0 BACKGROUND**

#### **3.1 Main Steam Isolation Valves (MSIVs)**

As described earlier, one MSIV is installed in each of the four main steam lines outside the containment and downstream of the safety valves. The MSIVs prevent uncontrolled blowdown from more than one steam generator in the event of a postulated



design basis accident. The valves are bidirectional, double disc, parallel slide-gate valves.

### **3.2 MSIV Actuator Trains**

Each MSIV is equipped with two redundant actuator trains such that either actuator train can independently perform the safety function to fast-close the valve on demand. An actuation train consists of an accumulator and applicable solenoid valves on the associated MSIV. For each MSIV, one actuator train is associated with separation group 4 ("yellow"), and one actuator train is associated with separation group 1 ("red").

Each actuator train on a given valve is controlled by one of two redundant Main Steam Feedwater Isolation System (MSFIS) control panels, SA075A or SA075B. Control and logic functions in each MSFIS panel are provided by three programmable logic controllers with their outputs connected in a 2-out-of-3 logic matrix. The logic outputs are used to energize or de-energize four electrical solenoids in each train of the valve actuators for each MSIV, which enable each valve's hydraulics to perform the required valve functions. The fast-close safety function is accomplished by de-energizing one of the four solenoids in either actuator train for each MSIV. The remaining three solenoids are associated with other less critical functions of the actuators.

The safety design functions of the MSIV actuator trains are to close the MSIV within the required time frame (less than or equal to 5 seconds) and to prevent uncontrolled blowdown from more than one steam generator in the event of a main steam line break.

### **4.0 TECHNICAL ANALYSIS**

Consistent with other Technical Specifications, the proposed Completion Times / allowed outage times (AOTs) for inoperable MSIV actuator trains are to be based on a hierarchy of Conditions such that shorter Completion Times would be specified for increasingly degraded conditions. As noted previously, Conditions addressing inoperable MSIV actuator trains would be specified first in TS 3.7.2, i.e., before the Conditions that are currently in place for addressing inoperability of the MSIVs themselves. The intent is that when only an MSIV actuator train (or actuator trains) is declared inoperable, the applicable Condition for the inoperable MSIV actuator train(s) would be entered first. Then, depending on the number of MSIV actuator trains that are concurrently inoperable and what the associated Required Action requires for the applicable Condition, or if the Applicable Required Action and Completion Time cannot be met, the MSIV(s) associated with the inoperable actuator train(s) would be declared inoperable so that the Condition(s) addressing inoperability of the MSIV(s) itself would thus be entered.

As described in Section 2, five new Conditions, each with its associated Required Action and specified Completion Time, are proposed to address all of the possible situations involving inoperable MSIV actuator trains:

- Condition A addresses the situation when one MSIV actuator train is inoperable on one MSIV. Required Action A.1 requires restoring the inoperable MSIV actuator train to OPERABLE status within a specified Completion time of 72 hours.
- Condition B addresses the situation when two MSIV actuator trains are inoperable such that there is one actuator train inoperable for each of two MSIVs and the actuator trains are not in the same separation group. Required Action B.1 requires restoring at least one of the inoperable MSIV actuator trains to OPERABLE status within a specified Completion Time of 24 hours.
- Condition C addresses the situation of when two MSIV actuator trains are inoperable (again, such that there is one actuator train inoperable for each of two MSIVs) and the actuator trains are in the same separation group. Required Action C.1 requires restoring at least one of the inoperable MSIV actuator trains to OPERABLE status within the specified Completion Time of 4 hours.
- Condition D addresses the situation when two (both) actuator trains on one MSIV are inoperable. Required Action D.1 requires immediately declaring the affected MSIV inoperable. (A Completion Time of “Immediately” is thus specified in the Completion Time column of the Actions table in TS 3.7.2 for this Required Action.) If no other MSIV or MSIV actuation train inoperability existed at the time of this condition, this would result in Condition F or H (depending on the applicable plant MODE) being immediately entered for a single inoperable MSIV.
- Condition E addresses the condition of having three or more MSIV actuator trains inoperable, OR the condition when (after entering Conditions A, B or C) it is determined that the Required Action and Completion Time of Condition A, B, or C cannot be met. Required Action E.1 for this Condition would require immediately declaring each affected MSIV inoperable. Declaring only a single MSIV inoperable (due to the Required Action and Completion Time of Condition A not being met), would result in entry into Condition F (for MODE 1) or Condition H (for MODE 2 or 3). Declaring more than one MSIV inoperable would result in entry into Specification 3.0.3 (for MODE 1) or Condition H (for MODE 2 or 3), since (for the former) there is no Condition under TS 3.7.2 that addresses having more than one MSIV inoperable during MODE 1. Like Required Action D.1, a Completion Time of “Immediately” would be specified for Required Action E.1 in the Completion Time column of the Actions Table.

Justification for the Completion Times to be specified for Required Actions A.1, B.1, and C.1 is as follows:

- Condition A – With only a single actuator train inoperable on one MSIV, a Completion Time (AOT) of 72 hours for Required Action A.1 is reasonable in light of the fact that with one actuator inoperable, and because of the dual-redundant actuator design, the affected MSIV would still be capable of closing on demand (assuming no additional failures) via the remaining operable actuator. The proposed 72-hour Completion Time takes into account the design redundancy, reasonable time for repairs, and the low probability of a design basis accident occurring during this period.
- Condition B – With an inoperable actuator train on one MSIV and one inoperable actuator train on another MSIV, such that the actuator trains are not in the same separation group, a Completion Time / AOT of 24 hours for Required Action B.1 is reasonable since, again, the dual-redundant actuator train design ensures that with only one actuator train inoperable on each of the affected MSIVs, each MSIV would still be capable of closing on demand, assuming no additional failures. Compared to Condition A however, it is appropriate to have a shorter allowed outage time for Condition B since with an actuator train inoperable on each of two MSIVs, there is an increased likelihood that an additional failure (such as the failure of an actuation logic train) would cause an MSIV to fail to close.
- Condition C – With an inoperable actuator train on one MSIV and one inoperable actuator train on another MSIV, but with both inoperable actuator trains in the same separation group, a Completion Time of 4 hours for Required Action C.1 is appropriate. Like the above cases, the dual-redundant actuator train design for each MSIV ensures that a single inoperable actuator train for any MSIV would not prevent the affected MSIVs from closing on demand. In this regard, 4 hours is reasonable and conservative since only one actuator train per MSIV is permitted to be inoperable (for two MSIVs), so that the remaining operable actuator train on each affected MSIV remains capable of effecting valve closure on demand (assuming no additional failures). An AOT of 4 hours is also considered conservative with respect to the low probability of an event occurring during such an interval that would demand MSIV closure.

However, compared to the Required Action for Condition B above, a shorter AOT for Condition C is appropriate since with two actuator trains inoperable in the same separation group, an additional failure such as the failure of an actuation logic train in the other separation group could cause both affected MSIVs to fail to close on demand.

For Conditions D and E, the Completion Time of "immediately" is conservative and appropriate. For Condition D, for example, when both actuator trains for one MSIV are inoperable, it is appropriate to require immediately declaring the MSIV inoperable since having both actuator trains inoperable would constitute a condition that renders the affected MSIV incapable of closing on demand.

With respect to Condition E, for the Condition when the Required Action and associated Completion Time of Condition A, B, or C is not met, it follows that the affected MSIV(s) should immediately be declared inoperable since the assumption is that the AOT(s) of Condition A, B, or C has expired or cannot be met. This "default" Condition is in keeping with the intent that when only the actuator trains for affected MSIVs are inoperable (and not the valves themselves), the Conditions and Required Actions for the inoperable MSIV actuator trains should be entered first, and then if those Required Actions cannot be met, the affected MSIVs should be declared inoperable so that the Conditions and Required Actions for the inoperable valves are then entered. Required Action E.1 ensures the affected MSIV(s) is promptly declared inoperable. This format or approach is consistent with other Technical Specifications and the format of the Standard Technical Specifications (NUREG-1431).

For the other part of Condition E, i.e., for the condition when three or more actuator trains are inoperable, it is conservative and appropriate as well to immediately declare the affected MSIVs inoperable for this condition. For the situation of having three actuator trains inoperable, for example, such a condition could involve two inoperable actuator trains on one MSIV and one inoperable actuator train on another MSIV, or an inoperable actuator train on each of three MSIVs. In each case, the inoperable actuator trains could all be in the same separation group or be staggered among the two separation groups. In the former case, a single assumed failure such as an instrument logic train failure could cause one or two MSIVs to fail to close on demand. In the latter case, such a single failure could cause either none of the MSIVs to fail to close on demand, or all three to fail to close on demand. Thus, immediately declaring the affected MSIVs inoperable is either appropriate or conservative. In any case, the conditions addressed by Condition E would constitute an inoperability that exceeds the scope of any of the conditions addressed by Conditions A, B, or C, and it is conservative in this case to simply require declaring all of the affected MSIVs inoperable.

It should be noted that a probabilistic risk analysis was performed to evaluate the risk associated with allowed outage times for inoperable MSIV actuator trains. This analysis was not used to establish the proposed AOTs (for proposed Conditions A, B and C), but it was used to gauge the acceptability of the AOTs being proposed, which were based on engineering judgment and consistency with other Technical Specifications, as described above. In particular, a PRA analysis using Regulatory Guide (RG) 1.174/1.177 metrics was performed to determine maximum allowed outage times, using conservative assumptions. For example, it was assumed that failure to isolate necessarily results in core damage. Also, no credit was taken for operator actions to provide backup isolation capability. Results of the analysis were as follows for the noted inoperability conditions:

<u>Condition</u>	<u>Allowed Outage Time</u>
(1) One actuator train on one MSIV inoperable	17 days
(2) One actuator train on one MSIV inoperable <u>and</u> one actuator train in the other train on a different MSIV inoperable	8 days
(3) One actuator train on one MSIV inoperable <u>and</u> one actuator train in the same train on a different MSIV inoperable	5 hours

The above conditions correspond to proposed Conditions A, B and C, respectively. In light of the above, it can be seen that the proposed AOT of 72 hours for Condition A is quite conservative relative to the 17-day AOT calculated from the PRA analysis for that Condition; the proposed AOT of 24 hours for Condition B is also very conservative compared to the 8-day value calculated from the PRA analysis for that Condition, and the proposed AOT of 4 hours for Condition C is also bounded by the PRA-calculated value of 5 hours for that Condition.

With regard to the proposed AOTs for Conditions A, B, and C, it should be noted that the Technical Specification changes proposed in this amendment application are not considered to be risk-informed in that this application is not considered to be a RG 1.174/1.177 submittal. Although a PRA analysis was performed (using RG 1.174/1.177 metrics), that analysis was not used to determine the AOTs proposed for Conditions A, B and C. Rather, the results of the PRA analysis are presented herein simply to show that the proposed AOTs are less than what a PRA analysis would justify, thus providing a gauge of their acceptability and conservativeness from a risk point of view.

## **5.0 REGULATORY SAFETY ANALYSIS**

### **5.1 No Significant Hazards Consideration**

This license amendment request proposes to change the Technical Specifications to add Conditions, Required Actions, and Completion Times for MSIV actuator trains. These additions specifically address inoperable MSIV actuator trains. AmerenUE has evaluated whether or not a significant hazards consideration is involved with the proposed changes by focusing on the three standards set forth in 10 CFR 50.92(c) as discussed below:

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

Response: No.

The proposed changes to incorporate requirements for the MSIV actuator trains do not involve any design or physical changes to the facility, including the MSIVs and actuator trains themselves. The design and functional performance requirements, operational characteristics, and reliability of the MSIVs and actuator trains are thus unchanged. There is therefore no impact on the design safety function of the MSIVs to close (as an accident mitigator), nor is there any change with respect to inadvertent closure of an MSIV (as a potential transient initiator). Since no failure mode or initiating condition that could cause an accident (including any plant transient) evaluated per the FSAR-described safety analyses is created or affected, the change cannot involve a significant increase in the probability of an accident previously evaluated.

With regard to the consequences of an accident and the equipment required for mitigation of the accident, the proposed changes involve no design or physical changes to the MSIVs or any other equipment required for accident mitigation. With respect to MSIV actuator train allowed outage times, the consequences of an accident are independent of equipment allowed outage times as long adequate equipment availability is maintained. The proposed MSIV actuator train allowed outage times take into account the redundancy of the MSIV actuator trains and are limited in extent consistent with other allowed outage times specified in the Technical Specifications. Adequate equipment (MSIV) availability would therefore continue to be required by the Technical Specifications. On this basis, the consequences of applicable, analyzed accidents (such as a main steam line break) are not significantly impacted by the proposed changes.

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

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

Response: No.

None of the proposed changes, i.e. the addition of Conditions, Required Actions and Completion Times to Technical Specifications for the MSIV actuator trains, involve a change in the design, configuration, or operational characteristics of the plant. No physical alteration of the plant is involved, as no new or different type of equipment is to be installed. The proposed changes do not alter any assumptions made in the safety analyses, nor do they involve any changes to plant procedures for ensuring that the plant is operated within analyzed limits. As such, no new failure modes or mechanisms that could cause a new or different kind of accident from any previously evaluated are being introduced.

Therefore, the proposed changes do not create the possibility of 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 addition of Conditions, Required Actions and Completion Times to the Technical Specifications for the MSIV actuator trains does not alter the manner in which safety limits or limiting safety system settings are determined. No changes to instrument/system actuation setpoints are involved. The safety analysis acceptance criteria are not impacted by this change, and the proposed change will not permit plant operation in a configuration outside the design basis.

Therefore, the proposed changes do 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 regulatory basis for TS 3.7.2, "Main Steam Isolation Valves (MSIVs)," is the isolation of main steam flow from the secondary side of the steam generators following a high energy line break (HELB). Closure of the MSIVs terminates flow from the unaffected (intact) steam generators. The MSIVs prevent uncontrolled blowdown from more than one steam generator. Closing the MSIVs isolates each steam generator from the others, and isolates the turbine, Condenser Steam Dump System, and other auxiliary steam supplies from the steam generators. Note that the steam line to the auxiliary feedwater pump turbine is connected to a cross-connecting header upstream of the MSIV to ensure a supply of steam to this turbine when the steam generators are isolated.

The MSIVs isolate nonsafety related portions of the main steam supply system from the safety related portions. In the event of a main steam line break inside containment, the MSIVs close automatically. Closure of the MSIVs ensures that no more than one steam generator can supply the postulated break.

The safety related functions of the MSIV actuator trains are to close an MSIV within the specified time frame and to ensure that no more than one steam generator can supply a postulated break. A single failure of any active component cannot prevent the actuators from performing their safety functions. Adding requirements for the MSIV actuator trains provides appropriate limits on out-of-service times for an MSIV actuator

train, with consideration given to the redundant actuator train design, while also assuring adequate availability. At the same time, it also provides operability requirements appropriate to the MSIV actuator trains without having to unnecessarily or prematurely declare an MSIV inoperable when an actuator train is inoperable and thus have to take action that is unnecessarily restrictive for an MSIV actuator train.

The portion of the main steam supply system from the steam generators to the MSIVs is safety related and is required to function following a design basis accident (DBA), and to achieve and maintain the plant in a safe shutdown condition. General Design Criteria (GDC) 2, "Design Bases for Protection against Natural Phenomena," requires that the safety related portion of the main steam supply 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 main steam supply 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 that safety functions of the main steam supply system can be performed assuming a single active component failure coincident with the loss of offsite power.

The proposed TS changes do not affect the MSIV/main steam system design and its compliance with the above regulatory requirements and criteria. Thus, for the proposed amendment, 1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, 2) activities will continue to be conducted in compliance with the Commission's regulations, and 3) the 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. 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 PRECEDENTS**

The proposed amendment request to add operability requirements for the MSIV actuator trains to TS 3.7.2 is specific to the Callaway Plant. AmerenUE is not aware of any precedent for such changes.

## **8.0 REFERENCES**

- 8.1 Callaway Plant Technical Specification 3.7.2, "Main Steam Isolation Valves (MSIVs)"
- 8.2 FSAR Section 10.3, Main Steam Supply System.
- 8.3 FSAR Section 6.2, Containment Systems
- 8.4 FSAR Section 15, Accident Analysis
- 8.5 ASME, Boiler and Pressure Vessel Code, Section XI.
- 8.6 FSAR, Table 7.3-14, NSSS Instrument Operating Conditions for Isolation Functions.

**ATTACHMENT 3**

**MARKUP OF TECHNICAL SPECIFICATION PAGES**

3.7 PLANT SYSTEMS

3.7.2 Main Steam Isolation Valves (MSIVs)

INSERT 2

LCO 3.7.2 Four MSIVs shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<b>INSERT 1</b>		
<del>A</del> F One MSIV inoperable in MODE 1.	<del>A</del> .1 F Restore MSIV to OPERABLE status.	8 hours
<del>B</del> G Required Action and associated Completion Time of Condition <del>A</del> not met. F	<del>B</del> .1 G Be in MODE 2.	6 hours
<del>C</del> H ----- NOTE ----- Separate Condition entry is allowed for each MSIV. ----- One or more MSIVs inoperable in MODE 2 or 3.	<del>C</del> .1 H Close MSIV.  <u>AND</u> <del>C</del> .2 H Verify MSIV is closed.	8 hours  Once per 7 days
<del>D</del> I Required Action and associated Completion Time of Condition <del>C</del> not met. H	<del>D</del> .1 I Be in MODE 3.  <u>AND</u> <del>D</del> .2 I Be in MODE 4.	6 hours  12 hours

### INSERT 1

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One MSIV actuator train inoperable.	A.1 Restore MSIV actuator train to OPERABLE status.	72 hours
B. Two MSIV actuator trains inoperable for different MSIVs when the inoperable actuator trains are <u>not</u> in the same separation group.	B.1 Restore one MSIV actuator train to OPERABLE status.	24 hours
C. Two MSIV actuator trains inoperable when the inoperable actuator trains <u>are</u> in the same separation group.	C.1 Restore one MSIV actuator train to OPERABLE status.	4 hours
D. Two actuator trains for one MSIV inoperable.	D.1 Declare the affected MSIV inoperable.	Immediately
E. Three or more actuator trains inoperable.  <u>OR</u>  Required Action and associated Completion Time of Condition A, B, or C not met.	E.1 Declare each affected MSIV inoperable.	Immediately

**INSERT 2**

**and their associated actuator trains**

**ATTACHMENT 4**

**RETYPE TECHNICAL SPECIFICATION PAGES**

3.7 PLANT SYSTEMS

3.7.2 Main Steam Isolation Valves (MSIVs)

LCO 3.7.2 Four MSIVs and their associated actuator trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One MSIV actuator train operable.	A.1 Restore MSIV actuator train to OPERABLE status	72 hours
B. Two MSIV actuator trains inoperable for different MSIVs when the inoperable actuator trains are <u>not</u> in the same separation group.	B.1 Restore one MSIV actuator train to OPERABLE status.	24 hours
C. Two MSIV actuator trains inoperable when the inoperable actuator trains <u>are</u> in the same separation group.	C.1 Restore one MSIV actuator train to OPERABLE status	4 hours
D. Two actuator trains for one MSIV inoperable.	D.1 Declare the affected MSIV inoperable	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>E. Three or more actuator trains inoperable.</p> <p><u>OR</u></p> <p>Required Action and associated Completion Time of Condition A, B, or C not met.</p>	<p>E.1 Declare each affected MSIV inoperable</p>	<p>Immediately</p>
<p>F. One MSIV inoperable in MODE 1.</p>	<p>F.1 Restore MSIV to OPERABLE status.</p>	<p>8 hours</p>
<p>G Required Action and associated Completion Time of Condition F not met.</p>	<p>G.1 Be in MODE 2.</p>	<p>6 hours</p>
<p>H. -----NOTE----- Separate Condition entry is allowed for each MSIV. -----</p> <p>One or more MSIVs inoperable in MODE 2 or 3.</p>	<p>H.1 Close MSIV.</p> <p><u>AND</u></p> <p>H.2 Verify MSIV is closed.</p>	<p>8 hours</p> <p>Once per 7 days</p>
<p>I. Required Action and associated Completion Time of Condition C not met.</p>	<p>I.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>I.2 Be in MODE 4.</p>	<p>6 hours</p> <p>12 hours</p>



**ATTACHMENT 5**

**PROPOSED TECHNICAL SPECIFICATION BASES CHANGES**

**(for information only)**

## B 3.7 PLANT SYSTEMS

## B 3.7.2 Main Steam Isolation Valves (MSIVs)

BASES

## BACKGROUND

The MSIVs isolate steam flow from the secondary side of the steam generators following a high energy line break (HELB). MSIV closure terminates flow from the unaffected (intact) steam generators.

One MSIV is located in each main steam line outside, but close to, containment. The MSIVs are downstream from the main steam safety valves (MSSVs) and auxiliary feedwater (AFW) pump turbine steam supply, to prevent MSSV and AFW isolation from the steam generators by MSIV closure. Closing the MSIVs isolates each steam generator from the others, and isolates the turbine, Condenser Steam Dump System, and other auxiliary steam supplies from the steam generators.

The MSIV is a <sup>add hyphen</sup> 28-inch gate valve with dual-redundant hydraulic actuators. The assumed single failure of one of the redundant actuators will not prevent the MSIV from closing. ← **INSERT A1**

The MSIVs close on a main steam isolation signal generated by low steam line pressure, high steam line negative pressure rate or High-2 containment pressure. The MSIVs fail as is on loss of control or actuation power.

Each MSIV has an MSIV bypass valve. Although these bypass valves are normally closed, they receive the same emergency closure signal as do their associated MSIVs. The MSIVs may also be actuated manually.

A description of the MSIVs is found in the FSAR, Section 10.3 (Ref. 1).

---

**APPLICABLE  
SAFETY  
ANALYSES**

The design basis of the MSIVs is established by the containment analysis for the large steam line break (SLB) inside containment, discussed in the FSAR, Section 6.2.1.4 (Ref. 2). It is also affected by the accident analysis of the SLB events presented in the FSAR, Section 15.1.5 (Ref. 3). The design precludes the blowdown of more than one steam generator, assuming a single active component failure (e.g., the failure of one MSIV to close on demand).

The limiting case for the containment pressure analysis is the SLB inside containment, with initial reactor power at 25% with loss of offsite power and the failure of one emergency diesel generator (Ref. 6). Because of increased energy storage in the primary plant, increased heat transfer in the steam generators, and the additional energy generation in the nuclear

(continued)

**INSERT A1**

Each actuator is part of an actuator train that consists of an accumulator and applicable solenoid valves on the associated MSIV. For each MSIV, one actuator train is associated with separation group 4 ("yellow"), and one actuator train is associated with separation group 1 ("red").

**BASES**

**APPLICABLE SAFETY ANALYSES**  
(continued)

- c. A break downstream of the MSIVs will be isolated by the closure of the MSIVs.
- d. Following a steam generator tube rupture, closure of the MSIVs isolates the ruptured steam generator from the intact steam generators to minimize radiological releases.
- e. The MSIVs are also utilized during other events such as a feedwater line break. This event is less limiting as far as MSIV OPERABILITY is concerned.

The MSIVs satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

**LCO**

*all* → *INSERT A3*

This LCO requires that four MSIVs ~~in the steam lines~~ be OPERABLE. The MSIVs are considered OPERABLE when the isolation times are within limits and they are capable of closing on an isolation actuation signal. ← *INSERT A2*

This LCO provides assurance that the MSIVs will perform their design safety function to mitigate the consequences of accidents that could result in offsite exposures comparable to the 10 CFR 100 (Ref. 4) limits or the NRC staff approved licensing basis.

**APPLICABILITY**

The MSIVs must be OPERABLE in MODES 1, 2 and 3, when there is significant mass and energy in the RCS and steam generators. When the MSIVs are closed, they are performing the safety function.

In MODE 4, 5 or 6, the steam generator energy is low. Therefore, the MSIVs are not required for isolation of potential high energy secondary system pipe breaks in these MODES.

**ACTIONS**

*F A1*

*INSERT B*

With one MSIV inoperable in MODE 1, action must be taken to restore OPERABLE status within 8 hours. Some repairs to the MSIV can be made with the unit hot. The 8 hour Completion Time is reasonable, considering the low probability of an accident occurring during this time period that would require a closure of the MSIVs.

The 8 hour Completion Time is greater than that normally allowed for containment isolation valves because the MSIVs are valves that isolate a closed system penetrating containment. This time is reasonable due to

(continued)

## INSERT A2

An MSIV actuator train is considered OPERABLE when it is capable of fast-closing the associated MSIV on demand and within the required isolation time. This includes having adequate accumulator pressure to support fast-closure of the MSIV within the required isolation time.

## INSERT A3

and their associated actuator trains

## INSERT B

### A.1

With only a single actuator train inoperable on one MSIV, action must be taken to restore the inoperable actuator train to OPERABLE status within 72 hours. The 72-hour Completion Time is reasonable in light of the dual-redundant actuator train design such that with one actuator train inoperable, the affected MSIV is still be capable of closing on demand via the remaining operable actuator train. The 72-hour Completion Time takes into account the design redundancy, reasonable time for repairs, and the low probability of a design basis accident occurring during this period.

### B.1

With an actuator train on one MSIV inoperable and an actuator train on another MSIV inoperable, such that the inoperable actuator trains are not in the same separation group, action must be taken to restore one of the inoperable actuator trains to OPERABLE status within 24 hours. With two actuator trains inoperable on two MSIVs, there is an increased likelihood that an additional failure (such as the failure of an actuation logic train) could cause one MSIV to fail to close. The 24-hour Completion Time is reasonable, however, since the dual-redundant actuator train design ensures that with only one actuator train on each of two affected MSIVs inoperable, each MSIV is still capable of closing on demand.

### C.1

With an actuator train on one MSIV inoperable and an actuator train on another MSIV inoperable, but with both inoperable actuator trains in the same separation group, action must be taken to restore one of the inoperable actuator trains to OPERABLE status within 4 hours. A reasonable amount of time for restoring at least one actuator train is permitted since the dual-redundant actuator train design for each MSIV ensures that a single inoperable actuator train cannot prevent the affected MSIV(s) from closing on demand. With two actuator trains inoperable in the same separation group, however, an additional

failure (such as the failure of an actuation logic train in the other separation group) could cause both affected MSIVs to fail to close on demand. The 4-hour Completion Time takes into account the low probability of occurrence of an event that would require MSIV closure during such an interval.

#### D.1

With both (two) actuator trains for a single MSIV inoperable, the affected MSIV must immediately be declared inoperable. This is appropriate since such a condition renders the affected MSIV incapable of closing on demand.

#### E.1

With three or more MSIV actuator trains inoperable, or with the Required Action and associated Completion Time of Condition A, B, or C not met, the affected MSIVs must immediately be declared inoperable. Having three actuator trains inoperable could involve two inoperable actuator trains on one MSIV and one inoperable actuator train on another MSIV, or an inoperable actuator train on each of three MSIVs, for which the inoperable actuator trains could all be in the same separation group or be staggered among the two separation groups.

Depending on which of these conditions or combinations is in effect, the condition or combination could mean that all of the affected MSIVs remain capable of closing on demand (due to the dual-redundant actuator train design), or that at least one MSIV is inoperable, or that with an additional single failure up to all three MSIVs could be incapable of closing on demand. Therefore, in some cases, immediately declaring the affected MSIVs inoperable is conservative (when some or all of the affected MSIVs may still be capable of closing on demand even with a single additional failure), while in other cases it is appropriate (when at least one of the MSIVs would be inoperable, or up to all three could be rendered inoperable by an additional single failure). Since Condition E addresses all of these conditions or combinations, Required Action E.1 is conservatively based on the worst-case condition and therefore requires immediately declaring all of the affected MSIVs inoperable. It may be noted that declaring two or more MSIVs inoperable during Mode 1 requires entry into Specification 3.0.3.

BASES

ACTIONS F A.1 (continued)

the relative stability of the closed system which provides an additional passive means for containment isolation.

G B.1

H

If the MSIV cannot be restored to OPERABLE status within 8 hours, 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 MODE2 within 6 hours and Condition Q would be entered. The Completion Times are reasonable, based on operating experience, to reach MODE 2 and to close the MSIVs in an orderly manner and without challenging unit systems.

H C.1 and C.2

H

H

Condition Q is modified by a Note indicating that, when two or more MSIVs are inoperable in Mode 2 or 3, separate Condition entry is allowed for each MSIV.

Since the MSIVs are required to be OPERABLE in MODES 2 and 3, the inoperable MSIVs may either be restored to OPERABLE status or closed. When closed, the MSIVs are already in the position required by the assumptions in the safety analysis.

The 8 hour Completion Time is consistent with that allowed in Condition Q.

F.

For inoperable MSIVs that cannot be restored to OPERABLE status within the specified Completion Time, but are closed, the inoperable MSIVs must be verified on a periodic basis to be 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 MSIV status indications available in the control room, and other administrative controls, to ensure that these valves are in the closed position.

I D.1 and D.2

I

If the MSIVs cannot be restored to OPERABLE status or are not 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

(continued)

## BASES

## ACTIONS

I Ø.1 and I Ø.2 (continued)

must be placed at least in 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 MODE 2 conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE  
REQUIREMENTSSR 3.7.2.1

This SR verifies that MSIV closure time is  $\leq 5.0$  seconds from each actuator train when tested pursuant to the Inservice Test Program. The MSIV isolation 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 MSIVs should not be tested at power, since even a part stroke exercise increases the risk of a valve closure when the unit is generating power.

The Frequency is in accordance with the Inservice Testing Program.

This test is conducted in MODE 3 with the unit at operating temperature and pressure. 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 3.7.2.2

This SR verifies that each MSIV is capable of closure on an actual or simulated actuation signal. The manual fast close handswitch in the Control Room provides an acceptable actuation signal. This Surveillance is normally performed upon returning the unit to operation following a refueling outage in conjunction with SR 3.7.2.1. However, it is acceptable to perform this surveillance individually. The frequency of MSIV testing is every 18 months. The 18 month Frequency for testing is based on the refueling 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 3.7.2.1 and SR 3.7.2.2 concurrently.

## REFERENCES

1. FSAR, Section 10.3, Main Steam Supply System.
2. FSAR, Section 6.2, Containment Systems.

(continued)



**ATTACHMENT 6**

**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 within 90 days of NRC approval	90 days
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 14