

August 24, 2010

ULNRC-05724

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

10 CFR 50.90

Ladies and Gentlemen:

**DOCKET NUMBER 50-483
CALLAWAY PLANT
UNION ELECTRIC CO.
APPLICATION FOR AMENDMENT TO
FACILITY OPERATING LICENSE NPF-30
COMPLETION TIME EXTENSIONS FOR TS 3.3.2
ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS)
INSTRUMENTATION FUNCTIONS
TAC NO. ME2822 (LDCN 09-0039 SUPPLEMENT)**

- References:
1. AmerenUE letter ULNRC-05665 dated November 25, 2009
 2. AmerenUE letter ULNRC-05694 dated April 22, 2010
 3. AmerenUE letter ULNRC-05704 dated May 14, 2010
 4. NRC letter dated May 5, 2010, "Callaway Plant, Unit 1 – Issuance of Amendment RE: Revision of Technical Specification 3.3.2, "Engineered Safety Feature Actuation System Instrumentation," Function 6.G, Condition J (Exigent Circumstances) (TAC. NO. ME3595," ADAMS Accession No. ML101100665

AmerenUE submitted a license amendment request via Reference 1 that proposed changes to Technical Specification (TS) 3.3.2 as contained in Facility Operating License Number NPF-30 for the Callaway Plant. AmerenUE responded to NRC requests for additional information (RAIs) in support of that amendment application via References 2 and 3.

The changes requested and described in Attachment 2 of Reference 1 included the revision of Condition J of TS 3.3.2. Specifically, a new Note for limiting Separate Condition entry was proposed, along with the revision of the Completion Times of Required Actions J.1 and J.2. However, after the issuance of License Amendment No. 196 in Reference 4, it was recently recognized that the proposed Note on Separate Condition entry would not accomplish the intended function discussed in Reference 1 since Condition J has been revised to cover one or more



inoperable channels, thereby covering the inoperability of one, two, three, or all four channels of TS Table 3.3.2-1 Function 6.g.

An amendment supplement is therefore required to revise the changes proposed in Reference 1. Attachment 1 hereto describes the basis and justification for the new changes to TS 3.3.2 Condition J and the associated TS Bases for Condition J. Attachment 2 includes an information copy of the original TS 3.3.2 Condition J and Bases changes requested in Reference 1. Attachments 3 through 5 provide the revised Markup of Technical Specification 3.3.2 Condition J, Retyped Technical Specification 3.3.2 Condition J, and Proposed Technical Specification 3.3.2 Condition J Bases Changes, respectively. Attachments 3 through 5 supersede Attachments 2 through 4 of Reference 1 only with respect to the changes affecting TS 3.3.2 Condition J. All other TS and Bases changes requested in Attachments 2 through 4 of Reference 1 remain unchanged.

Attachment 5 hereto is provided for information only. Final TS Bases changes will be processed under the program described in TS 5.5.14, "Technical Specifications Bases Control Program," at the time this amendment is implemented.

The conclusions of the licensing evaluations submitted in Reference 1 (i.e., the no significant hazard consideration (NSHC) evaluation and the environmental consideration (EC) evaluation in Sections 5.1 and 6.0 of Attachment 1 to Reference 1, respectively) remain valid and unchanged.

In addition, it should be noted that, similar to the original amendment request, there are no commitments contained in this letter.

The Callaway Onsite Review Committee has reviewed and approved the submittal of the revised TS 3.3.2 Condition J and associated Bases markups.

AmerenUE continues to request approval of this license amendment request prior to November 20, 2010. In addition, AmerenUE still requests that the license amendment be made effective upon NRC issuance, to be implemented within 90 days from the date of issuance.

In accordance with 10 CFR 50.91, a copy of this letter is being provided to the designated Missouri State official. If you have any questions on this amendment application, please contact Mr. Scott Maglio (573) 676-8719 or Mr. Tom Elwood at (314) 225-1905.

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

Very truly yours,

Executed on: 8/24/10



Scott Sandbothe
Manager, Plant Support

GGY/nls

Attachments

- 1 – Basis and Justification for New Changes to TS 3.3.2 Condition J and Bases
- 2 – Original TS 3.3.2 Condition J and Bases Change Requests
- 3 – Markup of Technical Specification 3.3.2 Condition J
- 4 – Retyped Technical Specification 3.3.2 Condition J
- 5 – Proposed Technical Specification 3.3.2 Condition J Bases Changes (for information only)

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ATTACHMENT 1

BASIS AND JUSTIFICATION FOR NEW CHANGES TO TS 3.3.2 CONDITION J AND BASES

**BASIS AND JUSTIFICATION FOR NEW CHANGES TO
TS 3.3.2 CONDITION J AND BASES**

Original Amendment Request

In AmerenUE's original amendment request (Reference 1, ULNRC-05665 dated November 25, 2009), the following discussion of the proposed change to Technical Specification (TS) 3.3.2 Condition J was provided in Section 2.0 of Attachment 1:

“Since the risk impact associated with the loss of one train of BOP ESFAS actuation logic and actuation relays is greater than the loss of individual analog channel input(s) into that BOP ESFAS train, it is also proposed that the Completion Times for TS 3.3.2 Required Action J.1 (for TS Table 3.3.2-1 Function 6.g, Auxiliary Feedwater – Trip of All Main Feedwater Pumps) and Required Action O.1 (for TS Table 3.3.2-1 Function 6.h, Auxiliary Feedwater – Pump Suction Transfer on Suction Pressure – Low) be changed from 1 hour to 24 hours. The Completion Time for Required Action J.2 (shutdown to MODE 3 if Required Action J.1 is not met within 24 hours) would be extended to 30 hours (24 + 6). The Completion Time for Required Action O.2 would be unchanged.

An additional restriction would be added to TS 3.3.2 Condition J in the form of a new Note limiting the application of separate Condition entry. Since the Required Channels for Function 6.g are specified in TS Table 3.3.2-1 as 2 per pump, Condition J may be entered separately for each main feedwater pump. However, as shown on the J-104-00176 logic block diagram provided in Attachment 5, satisfying the trip logic requires the presence of a low oil pressure signal in the same separation group on each main feedwater pump. An inoperable separation group 1 channel on one pump coincident with an inoperable separation group 4 channel on the other pump would lead to the loss of this actuation function. Therefore, a new Note would be added to Condition J that would read:

‘Separate Condition entry is restricted to one inoperable channel per pump in the same separation group.’

This would assure that the AFW start signal after the loss of both main feedwater pumps would be generated by the operable inputs from the other separation group to both motor-driven AFW pumps (cross train actuations are provided as shown in Attachment 5).”

The changes proposed in AmerenUE's original license amendment request for TS 3.3.2 Condition J and the associated Condition J Bases are included in Attachment 2 to this supplemental submittal. Those changes are superseded by this letter.

Effect of License Amendment 196

Prior to the Reference 1 submittal, Condition J addressed only one inoperable channel and Separate Condition entry was allowed on one inoperable channel per main feedwater pump since the Required Channels in TS Table 3.3.2-1 were specified on a “per pump” basis. As discussed above, a new Note was proposed in Reference 1 to restrict Separate Condition entry in conjunction with extending the Completion Time of Required Action J.1 from 1 hour to 24 hours.

Reference 4 changed TS 3.3.2 Condition J to address one or more inoperable channels.

Given the implementation of Reference 4, for a scenario in which there are two inoperable Function 6.g channels in different separation groups (such as the situation when one main feedwater pump is removed from service during power operations for maintenance as discussed in Reference 4), the Separate Condition entry Note would not accomplish the intended purpose described above (retention of the actuation function) during the 24-hour allowed outage time prior to placing the inoperable channels in a tripped condition per Required Action J.1. The originally proposed Separate Condition entry Note would, in fact, offer no restriction to the inoperability of three or four channels, in which case the actuation signal from Function 6.g would not be available.

However, with regard to the potential unavailability of the start signal to the motor-driven AFW pumps upon a loss of both main feedwater pumps, Function 6.g of TS Table 3.3.2-1 does not perform a required accident mitigation function as discussed in Section 3.1.6 of the NRC Safety Evaluation attached to Reference 4 (excerpted below):

“The auto-start of AFW on loss of MFW is an anticipatory safety function, designed to mitigate the operational impact of a loss-of-feedwater events. The AFW start from the loss of MFW pump is not a requirement in the licensee's design basis event analyses. The design basis events that impose AFW safety function requirements are loss of normal feedwater; main feed line or main steam line break, LOOP, and small break loss-of-coolant accident. These design basis events assume auto-start of the AFW system in the event of a LOOP, a safety injection (SI) signal, or low-low SG water level. Therefore, even though the auto-start of MDAFW pumps upon an MFW pump trip is an ESFAS function in TS Table 3.3.2-1, function 6.g, the function is only an anticipatory start signal and no credit is taken in any of the licensee's safety analysis described in its FSAR.”

Therefore, in order to reconcile the Reference 1 amendment request against the current wording of TS 3.3.2 Condition J, the PRA evaluation results submitted in Reference 1 must be re-examined.

Impact on Combined Risk Metric Results

The following Table 1 provides the risk metric results submitted in Reference 1 for this amendment request. Those results are associated with the failure of SA036E, the separation group IV BOP ESFAS actuation logic cabinet. Specifically, the yearly risk contribution from a single TS 3.3.2 Condition Q 24-hour entry per year (ICCDP and ICLERP values apply to each Condition entry) is reflected below:

Risk Metric	Acceptance Criteria	Callaway Results			
		Internal	Flood	Fire	Total
Δ CDF	$<1E-06 \text{ yr}^{-1}$ very small RG 1.174	$7.23E-09 \text{ yr}^{-1}$	$3.21E-09 \text{ yr}^{-1}$	$8.77E-09 \text{ yr}^{-1}$	$1.92E-08 \text{ yr}^{-1}$
Δ LERF	$<1E-07 \text{ yr}^{-1}$ very small RG 1.174	$2.58E-10 \text{ yr}^{-1}$	$6.73E-12 \text{ yr}^{-1}$	$1.84E-11 \text{ yr}^{-1}$	$2.83E-10 \text{ yr}^{-1}$
ICCDP	$<5E-07$ RG 1.177	$7.23E-09$	$3.21E-09$	$8.77E-09$	$1.92E-08$
ICLERP	$<5E-08$ RG 1.177	$2.58E-10$	$6.73E-12$	$1.84E-11$	$2.83E-10$

As a result of License Amendment 196 there is a need to evaluate not only the failure of SA036E (TS Table 3.3.2-1 Function 6.c) but also the failure of the actuation signals initiated by Function 6.g and processed by SA036D (separation group I BOP ESFAS actuation logic cabinet) to the 'A' train motor-driven auxiliary feedwater pump (MDAFW pump 'A'). Those motor-driven auxiliary feedwater actuation signals (AFAS) include the following start signals:

1. Manual start (TS Table 3.3.2-1 Function 6.a)
2. Two-out-of-four low-low level signals in any one steam generator (TS Table 3.3.2-1 Functions 6.b and 6.d)
3. Trip of both main feedwater pumps (TS Table 3.3.2-1 Function 6.g).
4. AMSAC (not covered by the Technical Specifications).

The Callaway PRA does not model the individual channel inputs into SA036A (separation group I BOP ESFAS input / termination cabinet); therefore, the results presented below conservatively assume that the failure probability of the SA036D output signals to start MDAFW pump 'A' is comprised of two equal parts:

1) the Function 6.b/6.d start signals on low-low SG level and 2) the Function 6.g start signals on loss of both main feedwater pumps. The AMSAC failure event probability was also modified to reflect the failure of SA036E and SA036D.

The start signal processed by a safeguards sequence signal, initiated by either a safety injection signal or a loss-of-offsite power through the Load Shedder Emergency Load Sequencer (LSELS), to MDAFW pump 'A' (TS Table 3.3.2-1 Functions 6.e and 6.f) would still be available for starting MDAFW pump 'A' as would the Function 6.a manual start processed through SA036D.

The results below reflect the loss of all equipment actuated by SA036E and the Function 6.g start signals to MDAFW pump 'A' from SA036D.

The yearly risk contribution from a single TS 3.3.2 Condition Q 24-hour entry per year, coincident with the loss of the Function 6.g start signals to MDAFW pump 'A' from SA036D (ICCDP and ICLERP values apply to each Condition entry), is reflected below:

Risk Metric	Acceptance Criteria	Callaway Results			
		Internal	Flood	Fire	Total
Δ CDF	$<1\text{E-}06 \text{ yr}^{-1}$ very small RG 1.174	$9.71\text{E-}08 \text{ yr}^{-1}$	$1.70\text{E-}08 \text{ yr}^{-1}$	$1.36\text{E-}07 \text{ yr}^{-1}$	$2.50 \text{E-}07 \text{ yr}^{-1}$
Δ LERF	$<1\text{E-}07 \text{ yr}^{-1}$ very small RG 1.174	$4.47\text{E-}10 \text{ yr}^{-1}$	$3.57\text{E-}11 \text{ yr}^{-1}$	$2.86\text{E-}10 \text{ yr}^{-1}$	$7.68\text{E-}10 \text{ yr}^{-1}$
ICCDP	$<5\text{E-}07$ RG 1.177	$9.71\text{E-}08$	$1.70\text{E-}08$	$1.36\text{E-}07$	$2.50\text{E-}07$
ICLER P	$<5\text{E-}08$ RG 1.177	$4.47\text{E-}10$	$3.57\text{E-}11$	$2.86\text{E-}10$	$7.68\text{E-}10$

For comparison purposes, both of the above tables reflect the Callaway PRA model through the 4th Update plus a BOP ESFAS model change to capture the SG blowdown isolation valve actuation signal dependency on AFAS in addition to the safety injection signal and loss of offsite power signal.

The current Callaway PRA model includes Update 4a to address recent plant modifications that have been implemented subsequent to the submittal of Reference 1 and the receipt of Reference 4 that added backup Station Blackout diesel generators and a

backup auxiliary feedwater pump. Using Update 4a to evaluate the new changes to TS 3.3.2 Condition J would not provide a true comparison to the original risk metric results reported in Reference 1 since the total plant CDF was reduced from 5.18E-05/year at Update 4 to 2.64E-05/year at Update 4a. Therefore, the use of the PRA Update 4a model was not necessary or appropriate for the purposes of this submittal.

Conclusion

The proposed changes to TS 3.3.2 Condition J satisfy the Regulatory Guide 1.174 and Regulatory Guide 1.177 acceptance criteria for very small risk changes.

ATTACHMENT 2

ORIGINAL TS 3.3.2 CONDITION J AND BASES CHANGE REQUESTS

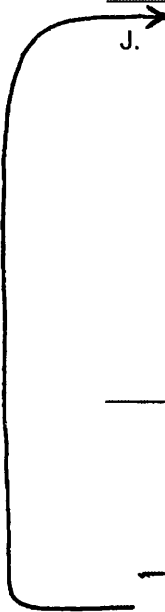
VOID

V O I D

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. One channel inoperable.	----- NOTE ----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels.	
	I.1 Place channel in trip.	72 hours
	<u>OR</u> I.2 Be in MODE 3.	78 hours
J. One Main Feedwater Pumps trip channel inoperable.	----- NOTE ----- The inoperable channel may be bypassed for up to 2 hours for surveillance testing of other channels.	
	J.1 Place channel in trip.	1 hour 24 hours
	<u>OR</u> J.2 Be in MODE 3.	30 ⑦ hours

(continued)



----- NOTE -----
INSERT 1

VOID

INSERT 1

Separate Condition entry is restricted to one inoperable channel per pump in the same separation group.

VOID

BASES

ACTIONS I.1 and I.2 (continued)

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 12 hours for surveillance testing of other channels. The 72 hours allowed to place the inoperable channel in the tripped condition, and the 12 hours allowed for an inoperable channel to be in the bypassed condition for testing, are justified in Reference 18.

J.1 and J.2

Condition J applies to the AFW pump start on trip of all MFW pumps.

This action addresses the train orientation of the BOP ESFAS for the auto start function of the AFW System on loss of all MFW pumps. The OPERABILITY of the AFW System must be assured by providing automatic start of the AFW System pumps. If a channel is inoperable, ~~4 hours~~ ^{24 hours are} allowed to place it in the tripped condition. If the channel cannot be tripped in ~~4 hours~~ ^{24 hours}, 6 additional hours are allowed to place the unit in MODE 3. The allowed Completion Time of ~~8 hours~~ ³⁰ is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, the unit does not have any analyzed transients or conditions that require the explicit use of the protection function noted above. The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 2 hours for surveillance testing of other channels.

INSERT 3.3.2.J

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

Condition K applies to:

- RWST Level - Low Low Coincident with Safety Injection.

RWST Level - Low Low Coincident With SI provides actuation of switchover to the containment recirculation sumps. Note that this Function requires the bistables to energize to perform their required action. The failure of up to two channels will not prevent the operation of this Function. This Action Statement limits the duration that an RWST level channel could be inoperable in the tripped condition in order to limit the probability for automatic switchover to an empty containment sump upon receipt of an inadvertent safety injection signal (SIS), coincident with a single failure of another RWST level channel, or for premature switchover to the sump after a valid SIS. This sequence of events would start the RHR pumps, open the containment sump RHR suction valves

(continued)

VOID

INSERT 3.3.2.J

Condition J is modified by a Note that restricts the application of the ACTIONS Note allowing separation Condition entry. Since the Required Channels for Function 6.g are specified in Table 3.3.2-1 as 2 per pump, Condition J may be entered separately for each main feedwater pump. However, as shown on FSAR Figure 7.3-1, sheet 2 (Ref. 2), satisfying the trip logic requires the presence of a low oil pressure signal in the same separation group on each main feedwater pump. An inoperable separation group 1 channel on one pump coincident with an inoperable separation group 4 channel on the other pump would lead to the loss of this actuation function requiring entry into LCO 3.0.3. This Note represents an additional requirement associated with the Completion Time increase approved for Condition J in Reference 23.

ATTACHMENT 3

MARKUP OF TECHNICAL SPECIFICATION 3.3.2 CONDITION J

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>I. One channel inoperable.</p>	<p>----- NOTE ----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. -----</p> <p>I.1 Place channel in trip.</p> <p><u>OR</u></p> <p>I.2 Be in MODE 3.</p>	<p>72 hours</p> <p>78 hours</p>
<p>J. One or more Main Feedwater Pumps trip channel(s) inoperable.</p>	<p>----- NOTE ----- One inoperable channel may be bypassed for up to 2 hours for surveillance testing of other channels. -----</p> <p>J.1 Place channel(s) in trip.</p> <p><u>OR</u></p> <p>J.2 Be in MODE 3.</p>	<p>4 hours 24 hours</p> <p>7 hours 30 hours</p>

(continued)

ATTACHMENT 4

RETYPE TECHNICAL SPECIFICATION 3.3.2 CONDITION J

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>I. One channel inoperable.</p>	<p>----- NOTE ----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. -----</p>	
	<p>I.1 Place channel in trip.</p>	72 hours
	<p><u>OR</u> I.2 Be in MODE 3.</p>	78 hours
<p>J. One or more Main Feedwater Pumps trip channel(s) inoperable.</p>	<p>----- NOTE ----- One inoperable channel may be bypassed for up to 2 hours for surveillance testing of other channels. -----</p>	
	<p>J.1 Place channel(s) in trip.</p>	24 hours
	<p><u>OR</u> J.2 Be in MODE 3.</p>	30 hours

(continued)

ATTACHMENT 5

PROPOSED TECHNICAL SPECIFICATION 3.3.2 CONDITION J BASES CHANGES (for information only)

BASES

ACTIONS

I.1 and I.2 (continued)

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 12 hours for surveillance testing of other channels. The 72 hours allowed to place the inoperable channel in the tripped condition, and the 12 hours allowed for an inoperable channel to be in the bypassed condition for testing, are justified in Reference 18.

J.1 and J.2

Condition J applies to the AFW pump start on trip of all MFW pumps (PAE01A and PAE01B).

This action addresses the train orientation of the BOP ESFAS for the auto start function of the AFW System or loss of all MFW pumps (PAE01A and PAE01B). The OPERABILITY of the AFW System must be assured by providing automatic start of the AFW System pumps. If one or more channel(s) are inoperable, ~~1 hour~~ is allowed to place the inoperable channel(s) in the tripped condition. If the channels cannot be tripped in ~~1 hour~~, 6 additional hours are allowed to place the unit in MODE 3. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, the unit does not have any analyzed transients or conditions that require the explicit use of the protection function noted above. The Required Actions are modified by a Note that allows one inoperable channel to be bypassed for up to 2 hours for surveillance testing of other channels.

24 hours,

24 hours are

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

Condition K applies to:

- RWST Level - Low Low Coincident with Safety Injection.

RWST Level - Low Low Coincident With SI provides actuation of switchover to the containment recirculation sumps. Note that this Function requires the bistables to energize to perform their required action. The failure of up to two channels will not prevent the operation of this Function. This Action Statement limits the duration that an RWST level channel could be inoperable in the tripped condition in order to limit the probability for automatic switchover to an empty containment sump upon receipt of an inadvertent safety injection signal (SIS), coincident with a single failure of another RWST level channel, or for premature

(continued)