1901 Chouteau Avenue
Post Office Box 149
St. Louis, Missouri 63166
314-554-2650

UNION ELECTRIC

Donald F. Schnell
Senior Vice President
Nuclear

February 2, 1996

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, D. C. 20555-0001

Gentlemen:

ULNRC-03320
TAC NO. M92975

CALLAWAY PLANT
DOCKET NUMBER 50-483
REVISION TO TECHNICAL SPECIFICATION
3/4.6 CONTAINMENT ISOLATION VALVES
Reference: ULNRC-3227 dated June 26, 1995

The referenced letter transmitted an application for amendment to Callaway Technical Specification 3/4.6, "Containment Isolation Valves". This letter transmits additional information in support of the amendment request. Attachment 1 is the original Nuclear Safety Evaluation which is revised as annotated by the revision bars in the margin.

If you have any additional questions concerning the subject amendment request, please contact us.

Very truly yours,

Donald F. Schnell

Donald F. Schnell

WEK/

Attachments: 1) Revised Nuclear Safety Evaluation
2) Response to NRC Questions
3) Revised Technical Specification
Page 3/4 6-16
4) Typical Containment Isolation Fault Tree
5) Fault Tree Solution Cutsets

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STATE OF MISSOURI)
) S S
CITY OF ST. LOUIS)

Donald F. Schnell, of lawful age, being first duly sworn upon oath says that he is Senior Vice President-Nuclear and an officer of 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 Donald F. Schnell
Donald F. Schnell
Senior Vice President
Nuclear

SUBSCRIBED and sworn to before me this second day of February, 1996.

Barbara J. Pfaff

BARBARA J. PFAFF
NOTARY PUBLIC — STATE OF MISSOURI
MY COMMISSION EXPIRES APRIL 22, 1997
ST. LOUIS COUNTY

cc: T. A. Baxter, Esq.
Shaw, Pittman, Potts & Trowbridge
2300 N. Street, N.W.
Washington, D.C. 20037

M. H. Fletcher
Professional Nuclear Consulting, Inc.
19041 Raines Drive
Derwood, MD 20855-2432

L. Joe Callan
Regional Administrator
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive
Suite 400
Arlington, TX 76011-8064

Senior Resident Inspector
Callaway Resident Office
U.S. Regulatory Commission
RR#1
Steedman, MO 65077

Kristine M. Thomas (2)
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
1 White Flint, North, Mail Stop 13E16
11555 Rockville Pike
Rockville, MD 20852-2738

Manager, Electric Department
Missouri Public Service Commission
P.O. Box 360
Jefferson City, MO 65102

Ron Kucera
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Don Woodlan
TU Electric
1601 Bryan Street
Dallas, TX 75201-3411

Pat Nugent
Pacific Gas & Electric
Regulatory Services
P.O. Box 56
Avila Beach, CA 93424

SAFETY EVALUATION

Proposed Change

This amendment request revises Technical Specification (TS) 3/4.6 by 1) removing the list of containment isolation valves, 2) revising the allowed outage time for containment isolation component cooling water (CCW) motor operated valves, and 3) allowing the use of containment penetration check valves as isolation devices.

The list of containment isolation valves, TS Table 3.6-1, is removed in accordance with the guidance of NRC Generic Letter 91-08, "Removal of Component Lists from Technical Specifications". This change is consistent with the provisions of the containment systems section of NUREG-1431, "Standard Technical Specifications for Westinghouse Plants" and consists of:

1. the deletion of references to Table 3.6-1 from TS 1.7, 3/4.6.1 and 3/4.6.3;
2. the addition of wording to Surveillance Requirement 4.6.1.1.a to exempt valves opened under administrative control as permitted by TS 3/4.6.4;
3. the addition of a note to LCO 3.6.3 to indicate that TS 3.0.4 does not apply, and that locked or sealed closed containment isolation valves may be opened under administrative control, and;
4. the revision of BASES Section 3/4.6.3 in accordance with the GL 91-08 guidance.

TS 3.6.3 is revised by the addition of a footnote to ACTION Statement (b). After satisfying this ACTION Statement the footnote would allow the CCW motor operated valves (MOVs) to be energized and cycled for up to 12 hours to conduct any actuator diagnostic evaluations which may be required to restore the valves to an OPERABLE condition. The current TS ACTION allowed outage time of 4 hours does not provide sufficient time to do required diagnostic evaluations.

TS LCO 3.6.3.c is revised to allow the use of penetration check valves as isolation devices. This change is also consistent with the provisions of the containment systems section of NUREG-1431.

Background

Containment integrity is provided by the containment structure and by isolating the various penetrations that pass through the containment structure walls. Maintaining containment integrity prevents excessive radioactivity from passing from the containment

to the atmosphere in the event of a release of radioactive material to the containment. The containment isolation valves are an integral part of the containment isolation design.

The function of containment isolation valves is to be closed or to automatically close to limit the release of radioactive fission products to the environment. TS 3/4.6.3 establishes requirements for containment isolation valves and TS Table 3.6-1 identifies those valves required to be OPERABLE to satisfy TS requirements.

Containment Isolation Valve Table Removal

This proposed change removes TS Table 3.6-1, Containment Isolation Valves, in accordance with GL 91-08. Specifications which refer to Table 3.6-1 are revised to reference the applicable valves by function. The proposed change allows Table 3.6-1 to be removed from the TS without altering existing TS requirements or those components to which they apply.

Generic Letter 91-08 provides guidance in removing component lists from the technical specifications. In accordance with the guidance, component lists removed from the TS must be relocated in plant documents subject to the change control provisions in the Administrative Controls Section of the TS. These changes then would allow the component lists to be updated outside of the license amendment process.

Union Electric will relocate the list of containment isolation valves to FSAR Chapter 16, which contains other relocated TS sections. Changes to the FSAR are subject to the provisions of 10 CFR 50.59. This process provides proper levels of review and approval of changes and for the identification of any unreviewed safety question. Records of the changes are maintained and an annual report submitted to NRC that describes the changes and provides a summary of the safety evaluation of each change. The FSAR is also updated every 18 months with any changes. Therefore, adequate controls exist to ensure that these components satisfy the applicable TS requirements. Relocation of Table 3.6-1 to Chapter 16 of the FSAR does not affect the purpose or information provided in FSAR Figure 6.2.4-1, Listing of Containment Piping Penetrations.

TS Table 3.6-1 identifies valves which may be opened during plant operation under administrative control. These valves are required to be opened for testing, maintenance, or other activities. Administrative control of these valves when opened in Modes 1 through 4 is required since rapid closure would be necessary to isolate the containment during accident conditions. TS 3/4.6.3 is revised to retain the ability to open locked or sealed closed valves under administrative control. This change is provided by

appropriate plant procedures, which are maintained under the provisions of 10 CFR 50.59.

Several Table 3.6-1 valves are exempt from the requirements of TS 3.0.4, as currently indicated by a table footnote. This change relocates the TS 3.0.4 exception to LCO 3.6.3, which causes this exception to apply to all containment isolation valves. TS 3.0.4 precludes entry into an operational mode or condition when an LCO would not be met without reliance on the provisions of the action requirements. GL 91-08 states that the action requirements for containment isolation valves permit continued operation with an inoperable valve when the associated penetration is isolated, therefore an exception to the limitation of TS 3.0.4 on changes in operational modes or conditions is acceptable for this specification. In addition, this increase in the scope of TS 3.0.4 is acceptable because it is also consistent with the guidance provided in Generic Letter 87-09.

The valve closure time requirements listed in Table 3.6-1 are maintained in appropriate plant procedures, the FSAR and the Callaway Inservice Testing Program. These documents are all controlled under the provisions of 10 CFR 50.59. Therefore, removing the Table 3.6-1 valve stroke times will not alter these requirements.

The proposed change does not alter the current TS requirements for containment isolation valve operability. The LCO and surveillance requirements will be retained in the TS. Therefore, the proposed changes will not affect the meaning, application, or function of the TS requirements for the containment isolation valves.

Allowed Outage time of 12 hours

TS 3.6.3 is revised by the addition of a footnote to ACTION Statement (b) allowing up to 12 hours to energize and cycle component cooling water MOVs in order to perform diagnostic testing.

Table 1 provides a listing of the penetrations and their associated MOVs that would be applicable to the proposed footnote to ACTION Statement (b). These penetrations are associated with the component cooling water supply and return lines supplying the reactor coolant pump motors and thermal barrier heat exchangers. A situation could exist which requires these MOVs to have maintenance performed on-line. If the allowed outage time of 4 hours is exceeded, the MOV must be closed to satisfy TS 3.6.3 ACTION (b). The addition of the footnote to this TS would allow sufficient time for the completion of diagnostic testing so the MOV could be returned to OPERABLE status.

The MOV predictive performance program describes the MOV diagnostic test program at Callaway Plant. This program satisfies requirements of Generic Letter 89-10, "Safety Related Motor Operated Valve Testing and Surveillance" and commitments to Bulletin 85-03, "Motor Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings" as well as predictive performance. Some forms of MOV maintenance require diagnostic testing be performed prior to declaring the MOV OPERABLE. The current Action Statement to TS 3.6.3 does not account for the time required to perform diagnostic testing. A review of the 24 baseline (full) MOVATS tests completed during Refuel 7 shows that the average duration for these tests was 11.25 hours. The actual test durations ranged from 5 to 20 hours, while ten of the tests took 12 or more hours to complete. We believe that 12 hours is an acceptable limit for the TS action statement based on our ability to concentrate efforts on an individual valve while the plant is on-line versus multiple activities during a refueling outage.

The penetrations listed in Table 1 meet acceptable alternatives to the explicit requirements of GDC 56 (as discussed in NUREG-0830) since they utilize automatic and remote manual isolation valves that fail "as is" versus failing closed upon loss of power to the valve operators. These penetrations are in service during normal operation with the automatic isolation valves open and the remote manual isolation valves closed. These penetrations are classified as essential and are therefore required to be open following an accident. For penetration 74, a check valve is provided inside containment and a normally open automatic isolation valve (EGHV0058) is provided outside containment. This penetration also utilizes a remote manual bypass valve (EGHV0127) outside containment. Penetrations 75 and 76 consist of normally open automatic isolation valves (EGHV0059, 0060, 0061, 0062) both inside and outside containment in conjunction with normally closed remote manual bypass valves (EGHV0130, 0131, 0132, 0133). This configuration is shown in the figures attached with Table 1. This arrangement is provided so a single active or passive failure will not result in the loss of both containment isolation barriers.

The proposed change to use check valves as isolation devices as allowed in TS LCO 3.6.3 Action Statement c. is not applicable to Penetration 74 (CCW to reactor coolant pumps) because the outside containment supply line consists of two motor-operated valves in parallel, one automatic isolation valve and one remote manual isolation valve. This design ensures that there is a supply of water to the reactor coolant pumps, but results in a situation whereby two valves must be closed to satisfy the TS action statement. Allowing 12 hours to restore the inoperable valves is acceptable because the system is closed (isolated from the RCS with flow through the penetration) and the penetration can still be isolated by the in-containment isolation device.

Based on this, the administrative controls in place while performing valve maintenance and the fact that the Callway PRA is unaffected by this change, the additional allowance of up to 12 hours to energize and cycle the inoperable valve to conduct any required diagnostic testing to restore the valve to OPERABLE status will not result in containment leakage that would exceed limits assumed in the safety analyses for a LOCA.

Use of Check Valves as Isolation Devices

TS LCO 3.6.3.c is revised to allow the use of penetration check valves to satisfy the requirements for penetration isolation.

The use of containment isolation check valves as isolation devices is acceptable because the Callaway containment design assumes that check valves will act as isolation devices. This is discussed in the NRC Safety Evaluation Report for Union Electric (NUREG-0830, dated October 1981) in section 6.2.3, Containment Isolation System.

The penetration check valves are subjected to Type C leak rate and full flow testing, which makes these valves highly reliable devices. These testing requirements are contained in the Callaway Inservice Testing Program. In addition, NUREG-1431 allows the use of check valves as isolation devices.

Miscellaneous Change

Table 3.6-1 includes the main steam and main feedwater isolation valves for table completeness only. These eight automatic valves will be removed from the TS and will not be relocated to the FSAR since the requirements of Specification 3.6.3 are not applicable to them and these valves are contained in Specifications 3.7.1.5 and 3.7.1.6.

Evaluation

The proposed revision to TS 3/4.6 to remove the listing of containment isolation valves, revise the ACTION Statement for the CCW MOVs, and credit penetration check valves as isolation devices does not involve an unreviewed safety question because operation of Callaway Plant with this change would not:

a) Increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the Safety Analysis Report.

   The proposed changes simplify the TS, meet the regulatory requirements for control of containment isolation and are consistent with the guidelines of GL 91-08. The information

contained in Table 3.6-1 has not been changed, but only relocated to a different controlling document. This is an administrative change which should result in improved plant practices and have no impact on plant operations. Addition of the footnote to allow up to 12 hours for valve testing does not affect the severity of any accident previously evaluated. The proposed revision to the TS will not adversely impact plant safety since the second barrier of the two required is still available to provide isolation between the containment atmosphere or the reactor coolant system and the outside atmosphere.

b) Create the possibility for an accident or malfunction of equipment of a different type than any previously evaluated in the Safety Analysis Report.

There are no design changes made that would create the possibility for an accident or malfunction of equipment. These changes do not result in any physical change to the plant. Addition of the footnote to allow up to 12 hours for valve testing does not affect the severity of any accident previously evaluated. The additional time provides assurance that the inoperable valve is in proper working order prior to returning it to OPERABLE condition.

c) Reduce the margin of safety as defined in the basis for any technical specification.

The proposed revision to the TS does not reduce the margin of safety assumed in any accident analysis. Containment isolation will still be maintained as provided by the second isolation valve to ensure that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a LOCA.

Conclusion

Given the above discussions as well as those presented in the Significant Hazards Consideration, the proposed change does not adversely affect or endanger the health or safety of the general public or involve a significant safety hazard.

TABLE 1

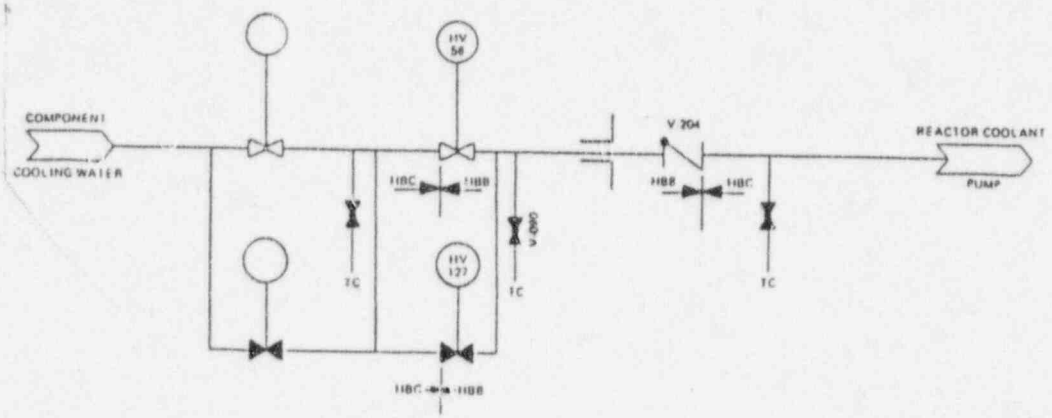
Penetration #	Valve(s)	Type Leak Test	GDC
P-74	EGHV0058*, 0127	C	56
P-75	EGHV0059*, 0060*,0130,0131	C	56
P-76	EGHV0061*, 0062*,0132,0133	C	56

* - automatic isolation valve

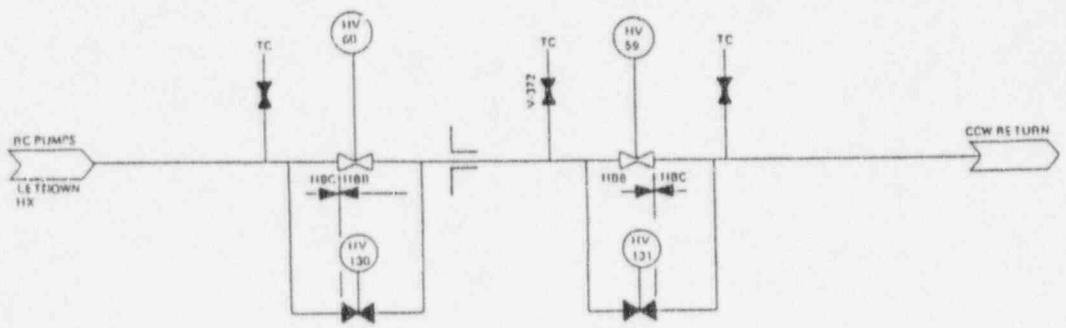
Figure 1

Callaway Containment Penetration Configuration

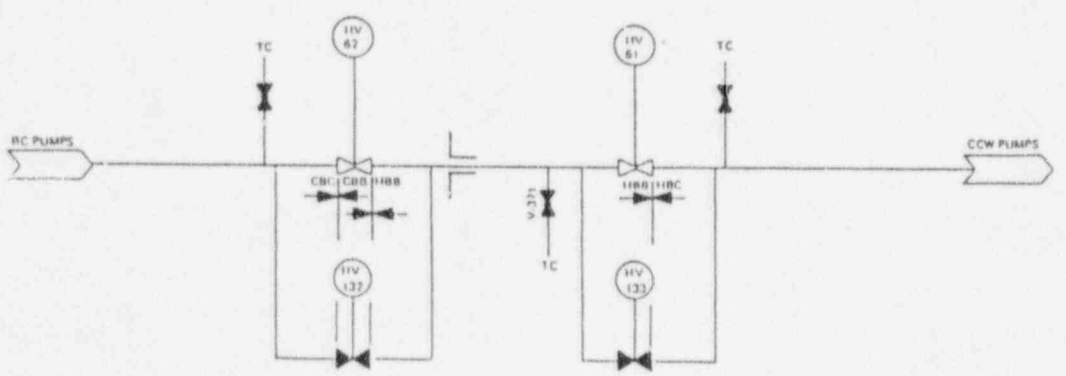
Penetration 74



Penetration 75



Penetration 76



ADDITIONAL INFORMATION

On October 23, November 17, and December 12, 1995, Union Electric and NRC personnel discussed the Callaway Plant containment isolation valve license amendment request. The NRC Staff asked several questions and requested additional information to clarify aspects of the change. The questions and additional information are as follows.

Question 1

Clarify the wording in the proposed ** footnote to Technical Specification 3.6.3.b, as this wording could be interpreted more than one way.

Response

The purpose of the ** footnote to Technical Specification 3.6.3.b is to allow time to perform any diagnostic testing required to declare CCW penetration MOVs OPERABLE. Union Electric is proposing to reword this footnote as shown in Attachment 3 to this letter. Please replace page 3/4 6-16 of our transmittal letter dated June 26, 1995 with this attachment.

The purpose of the * footnote to Technical Specification 3.6.3.b is to allow locked or seal-closed valves to be opened under administrative control. The administrative control is defined in the proposed change to Bases Section 3/4.6.3 as required by NRC Generic Letter 91-08. This footnote is modified as shown in Attachment 3 by the addition of the words "Locked or sealed-closed". This change satifies the requirements of Generic Letter 91-08 which states that:

"The list of containment isolation valves may also include a footnote that addresses an operational consideration for specific valves that may be opened on an intermittent basis under administrative control. This provision applies to valves that are locked or sealed closed consistent with the design requirements of General Design Criteria (GDC) 55, 56, and 57 of Appendix A to 10 CFR Part 50. The design of these valves includes positive control features to ensure that they are maintained closed. Therefore, in the absence of this provision, the opening of these locked or sealed closed valves would be contrary to the operability requirements for these valves that are currently listed in the TS table of containment isolation valves. With the removal of the TS list of valves, the operability requirements will apply to all containment isolation valves that have the locked or sealed closed feature as required by these GDC."

The generic Letter also states that "The footnote on opening valves under administrative control also may have been used in some plant TS for remote-manual valves associated with closed systems. A remote-manual valve is an acceptable alternative to a locked or sealed closed valve for closed systems as stated in GDC 57 in Appendix A to 10 CFR Part 50. Therefore, this footnote need not remain in the TS to allow operators to open any remote-manual containment isolation valve associated with closed systems because such action is not contrary to the operability requirements for these valves."

Question 2

Provide the basis for the 12 hour AOT as stated in the proposed footnote to Technical Specification 3.6.3.b.

Response

A review of the 24 baseline (full) MOVATS tests completed during Refuel 7 shows that the average duration for these tests was 11.25 hours. The actual test durations ranged from 5 to 20 hours. Ten of the tests took 12 or more hours to complete. We believe that 12 hours is an acceptable limit for the Technical Specification action statement based on our ability to concentrate our efforts on an individual valve while the plant is on-line versus multiple activities during a refueling outage. The 12 hour action includes time for actuator setup, retest, and data evaluation. Anything shorter than 12 hours would be difficult to complete in many cases.

Question 3

How are CDF (or CDP) and the LERF (large early release frequency) affected if the penetration is isolated and is maintained isolated, thereby terminating CCW flow to the RCPs? Would any of the small break LOCA sequences be affected?

Response

In order to respond to this question, relevant loss of RCP seal cooling accident sequences were requantified, with CCW flow to the RCP thermal barrier cooling coils failed. (Penetration 76 was assumed to be isolated for an indefinite period of time.) This requantification resulted in a revised total CDF of approximately 2.3E-4 per year. This represents an increase of approximately 300% over the CDF of 5.846E-5 per year reported in the Callaway IPE submittal.

Penetrations 74 and 75 were not considered because plant operation could not continue with these penetrations isolated.

In the Callaway PRA, LERF would not be affected, since penetrations P-74, -75 and -76 are closed to the containment atmosphere, and were therefore screened prior to fault tree modeling of the containment isolation function.

None of the Callaway small LOCA sequences are affected. This is because the Callaway PRA treats loss of RCP seal cooling, and the ensuing LOCA, separate from the small LOCA sequences. This is done in order to properly treat dependencies between the RCP seal LOCA event and functional failures in the event tree.

Question 4

How are the CDF (or CDP) and the LERF affected if the penetration cannot be, or is not, isolated under conditions when isolation is necessary?

Response

See the response to Question 5.

Question 5

Are the CDF or LERF affected at all by increasing the allowed outage time from 4 to 12 hours? If so, by how much?

Response

A probabilistic evaluation was performed to determine if increasing the AOT, from 4 to 12 hours, resulted in a significant increase in the Callaway containment isolation unavailability (failure probability). This was accomplished by developing a simplified fault tree model of failure to isolate penetration P-76, given that one of the containment isolation valves, EGHV61 or 62, was deemed inoperable and was being worked. The simplified fault tree is provided as Attachment 4.

The basic events used in the model, and the data used for these events, is discussed below:

- **BREAK-PSX** - A break occurs in pipe segment "X", the section of pipe between valves EGHV62, 132 and the containment penetration. The probability used for this event is 1.75E-6. This value was determined by multiplying an hourly break probability (2E-10) by 8760 hours per year.

- **BREAK-PSY** - A break occurs in pipe segment "Y", the section of pipe upstream of valves EGHV62, 132. The probability used for this event is the same as that used for event BREAK-PSX.

- **EG-MOV-OO-61AOT** - Valve EGHV61 fails to close, while in the TS AOT. A value of 0.5 was used for this event.

- **EG-MOV-OO-62AOT** - Valve EGHV62 fails to close, while in the TS AOT. A value of 0.5 was used for this event also.

- **EG-MOV-OO-EGHV61** - EGHV61 fails to close (valve not in the TS AOT). A value of 1.44E-3 was used. This is the MOV fail to close probability developed and used in the Callaway IPE.

- **EG-MOV-OO-EGHV62** - EGHV62 fails to close (valve not in the TS AOT). A value of 1.44E-3 was used.

- **EG-MOV-OO-HV132** - EGHV132 fails to close. A value of 1.44E-3 was used.

- **EG-MOV-OO-HV133** - EGHV133 fails to close. A value of 1.44E-3 was used.

- **EGHV61-OPEN** - Valve EGHV61 is in the TS AOT, and is open. This event was used as a scalar to reflect in the model the impact of increasing the AOT from 4 to 12 hours. For the 4 hour case, the value of this event was set to 1.0. For the 12 hour case, the value was set to 3.0 (i.e., 12/4).

- **EGHV62-OPEN** - Valve EGHV62 is in the TS AOT, and is open. The purpose of and values used for this event are the same as for EGHV61-OPEN, as described above.

- **EO-XHE-FO-EGHV61** - Equipment operator fails to manually close EGHV61 on command from the control room. A value of 1E-2 was used for this event.

- **EO-XHE-FO-EGHV62** - Equipment operator fails to manually close EGHV62 on command from the control room. A value of 1E-2 was also used for this event.

- **OP-XHE-FO-HV132** - Operators fail to close EGHV132 from the control room. A value of 1E-2 was used for this event.

- **OP-XHE-FO-HV133** - Operators fail to close EGHV133 from the control room. A value of 1E-2 was also used for this event.

In order to determine a baseline failure to isolate probability, i.e., a probability corresponding to the 4 hour AOT, the fault tree was quantified with the EGHV61-OPEN and EGHV62-OPEN scalar events set to 1.0. The resulting unavailability/failure probability was 3.14E-8. The fault tree solution cutsets from this quantification are provided as Attachment 5.

The fault tree solution cutset equation was then requantified with the above scalar events set to 3.0 to represent the 12 hour AOT. The resulting failure probability was 4.89E-8. The increase, then, associated with the 12 hour AOT is 1.75E-8 (i.e., 4.89E-8 minus 3.14E-8).

The Callaway IPE containment isolation fault tree models three (3) release pathways. (All other containment penetrations were screened, and hence were not fault tree modeled.) The three pathways modeled are the containment mini-purge system, the main steamline on a steamline break, and the feedline on a feedline break. The overall containment isolation failure probability is dominated by the mini-purge valves being open, and failing to close. The overall containment isolation failure probability is 4.53E-5.

The percentage increase in overall containment isolation failure probability, due to the increase in AOT from 4 to 12 hours, is 3.9E-2 percent (1.75E-8 divided by 4.53E-5, times 100%). Consequently, the increase in containment isolation failure probability due to the increased AOT is deemed insignificant.

Question 6

Explain how this change impacts the flooding portion of the IPEEE.

Response

Increasing the allowed outage time for the motor-operated valves associated with penetrations 74, 75 and 76 has insignificant impact on the flooding initiation frequency or consequences of flooding in the piping penetration room. The design basis worst case flooding evaluation for this area assumed a seismic induced moderate energy crack in a 12 inch RHR line. This was based on the worst case pipe break for the area, and an allowance for seismically supported or II/I supported non-seismic piping. The design basis evaluation determined no accumulation in the area and no flooding consequence. Therefore, an increase in the allowed valve outage time has no impact on this evaluation.

The increase in allowed outage time for the valves would not significantly alter the existing random pipe failure

probability. In addition to having a very low flooding initiator frequency, the component cooling water system includes safety-related piping with an extremely low random pipe break frequency. This is also a low total volume system and there are several drainage paths present in the area so accumulation is unlikely. Therefore, an increase in the valve allowed outage time has no impact.

Question 7

Explain how the MOVs for penetrations 74, 75, and 76 are configured (i.e., able to close against design DP).

Response

The primary valves (automatic isolation valves) are setup to close against maximum differential pressure (DP).

The bypass valves have no active safety function and are only opened under administrative control as is currently required by TS Table 3.6-1. The administrative controls for the bypass valves will be retained with Table 3.6-1 when relocated to the Callaway FSAR and will consist of written procedures, training for operators on those procedures, and the availability of an operator, if needed, to manually close the valve(s). These controls conform to the requirements of Generic Letter 91-18.

The control room operator will be responsible for remotely closing those bypass valves capable of operating against maximum DP. An operator, stationed at the valve, will be responsible for closing the bypass valve(s) not capable of operating against maximum DP (for those bypass valves located outside containment).

The provisions of the footnote to TS 3/4.6.3.b will not be utilized for those bypass valves located inside containment requiring manual operation, unless the valve can be closed remotely.