August 22, 2000

MEMORANDUM TO: File Center

FROM: Jack N. Donohew, Project Manager, Section 2
Project Directorate IV & Decommissioning **/RA/**
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: RESPONSE TO QUESTIONS ON LICENSE AMENDMENT REQUEST REGARDING OPEN CONTAINMENT PENETRATIONS UNDER ADMINISTRATIVE CONTROLS DURING REFUELING (TAC NO. MA9591)

On August 2, 2000, I sent questions on the amendment request related to open containment penetrations under administrative controls during refueling to David E. Shafer, Supervising Engineer, Regulatory Operations, for the Callaway Plant. Attached are the responses in an e-mail dated August 16, 2000. The responses clarify statements made in the licensee's application dated July 21, 2000 (ULNRC-04285).

The responses were discussed in a conference call on August 17, 2000. The discussion was primarily on the following:

(1) Implementation date: The implementation of the amendment includes the writing of procedures for the administrative controls. The procedures will be completed prior to the plant entering Mode 6, refueling, for the upcoming refueling outage in April 2001, refueling outage 11. In its application, the licensee stated that it would implement the amendment within 30 days of NRC approval and requested that the amendment be issued within 30 days of the next refueling outage scheduled for April 7, 2001. Therefore, the implementation date given in the response to Question 4 is consistent with the implementation given in the application.

(2) Continuous communication between control room (CR) and operators at the open penetrations: In Attachment II to the application, top of page 3, there was the statement that there would be continuous communication between the CR and the operators at the open penetrations. This was clarified in the response to Question 5. In the application on the bottom of page 2 of Attachment 2, the licensee stated that the continuous communication is for Modes 1 to 4 (i.e., not for refueling).

Docket No. 50-483

Attachment: E-mail dated August 16, 2000

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Attachment: E-mail dated August 16, 2000

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E-MAIL DATED AUGUST 16, 2000

From: "Walker, Dwyla J" <DWalker2@ameren.com>
To: "'jnd@nrc.gov'" <jnd@nrc.gov>
Date: Wed, Aug 16, 2000 4:24 PM
Subject: Responses to Questions on Callaway LAR for Admin. Controls on Open Ctmt. Penetrations during Refuel

Jack,

Please find attached responses to the questions that you e-mailed to us earlier. We will discuss them with you tomorrow on the scheduled telecon.

Dwyla Walker

<<jackdonohewanswers1.doc>>

CC: "Shafer, David E" <DShafer@ameren.com>, "Walker, D...

Question 1:

Where are values reported in the Callaway FSAR for the potential dose consequences to control room operators for the fuel handling accident (FHA) inside containment? A value of 8.33 rem thyroid was given in the Callaway application dated January 2, 1996, for Amendment No. 114. Because the values for the exclusion area boundary were revised in FSAR revision OL-9 (5/97) from those given in the application dated January 02, 1996, for Amendment No. 114, was the value for the control room operators given in that application also revised?

Response:

Post-FHA radiological consequences to Control Room operators are not reported in the Callaway FSAR. Section 15A.3 of the Callaway FSAR states that only post-LOCA radiological consequences to the Control Room operator will be presented in Callaway's FSAR. The basis for this is that LOCA radiological consequences bound the consequences for the other accident sequences for the Control Room operator. FSAR Table 15.6-8 states that post-LOCA thyroid dose to Control Room personnel is 25.55 Rem. The 8.33 Rem value given in the Amendment No. 114 application confirms that LOCA consequences continue to bound FHA consequences to the Control Room operator.

The application for Amendment No.114 provided an Exclusion Area Boundary thyroid dose of 73.1 Rem. Currently, Table 15.7-8 of Callaway's FSAR provides a rounded-off value of 73.0 Rem to the thyroid. The current FSAR value is in agreement with the current revision of the

radiological consequences calculation. The current revision of the containment FHA addresses Control Room doses. The 8.33 Rem thyroid dose value provided in the Amendment no. 114 application continues to conservatively bound calculated Control Room dose for this accident sequence. Additionally, it should be noted that calculated post Containment FHA consequences to Control room operators are bounded by the Licensing Bases post-LOCA consequences reported in the Callaway FSAR.

Question 2:

What were the release fractions for radiodines and noble gases used in calculating the potential dose consequences at the exclusion area boundary for the FHA inside containment that are in FSAR Table 15.7-8? Where are these release fractions given in the FSAR?

Response:

All of the gap inventories of the impacted assemblies are assumed to be released to the refueling pool water. The gap is assumed to contain 10% total radioactive iodine in the rods, and 10% of the total noble gases other than Kr-85 in the rods. A gap fraction of 30% is assumed for Kr-85. These gap fractions are consistent with Callaway's commitment to Regulatory Guide 1.25. The details of Callaway's commitment to Regulatory Guide 1.25 are listed in Table 15.7-2 of Callaway's FSAR.

Question 3:

In Amendments 114 and 120, the staff reported its own dose consequences from radioiodines to the public at the exclusion area boundary for the FHA inside containment. What differences in accident assumptions between the licensee and staff calculations result in the staff's dose consequences for the FHA inside containment in the two amendments being lower than the values in FSAR Table 15.7-8?

Response:

The SERs for Amendments 114 and 129 [120] were reviewed. Both SERs include radiological consequence values for a Callaway FHA inside containment. The consequences discussed in the Amendment 114 SER were based on the contents of 1 fuel assembly. The consequences discussed in Amendment 129 were based on the contents of 1.2 fuel assemblies. Per Section 15.7.4.5.1.2.a of the Callaway FSAR, the Licensing Bases FHA inside containment for Callaway should be based on the contents of 1.2 fuel assemblies. The assumption is that the all rods in the dropped assembly are assumed to be damaged, and that the dropped assembly is assumed to damage 20% of an another fuel assembly. The consequences discussed in the Amendment 129 SER are 20% greater than those discussed in the Amendment 114 SER.

The main cause of the NRC calculated radiological consequences being less than those reported by AmerenUE is most likely to be found in the determination of curie content of the impacted fuel assemblies. The limiting fuel assembly curie content used in the development of the consequences reported in Callaway's FSAR were derived using the ORIGEN computer code.

The Amendment 114 SER states that curie content of the damaged assemblies were calculated using TID-14844 methodology.

Question 4:

Will the administrative procedures, to allow containment penetrations with direct access to the outside atmosphere to be open under administrative controls during refueling operations with core alterations and irradiated fuel movement inside containment, be completed during the implementation of the proposed amendment?

Response:

The procedures that are required to allow open containment penetrations, with direct access to the outside atmosphere during refueling operations with core alterations and irradiated fuel movement inside containment, will be implemented in conjunction with the issuance and implementation of the approved license amendment just prior to
Refuel 11.

Question 5:

Besides the continuous communications between the control room and the individuals responsible for closing the penetrations, would there be other information to these individuals (e.g., evacuation signal inside containment upon an accident) so that they would be aware that the open penetrations must be closed?

Response:

The Callaway off-normal procedure for a fuel handling accident requires a containment evacuation during a fuel handling accident. During a fuel handling accident the alarm is initiated and all personnel would leave containment. TS Bases 3.9.4 contains administrative controls for leaving the personnel hatch doors open during movement of irradiated fuel in containment and during core alterations. There is no specific requirement for continuous communications between the control room and the individuals responsible for closure of a penetration.

The administrative controls provide for continual awareness of the open condition of penetrations and also provide that designated individuals close the penetrations when necessary. The same administrative controls were adopted for the scenario of the open personnel hatch during refueling. These administrative controls were found acceptable by the evaluations and dose calculations performed in support of the amendment request for open personnel hatch during refueling. They were found acceptable by the NRC in approval of License Amendment 114 which allows the open personnel hatch during refueling.

The scenarios posed by the open penetrations addressed in this proposed amendment request are bounded by the scenario of the open personnel hatch. The proposed administrative controls in this case would also be acceptable.

Question 6:

What will these individuals have to do to close the penetrations and how long should it take to close the penetrations?

Response:

The current FHA analysis and reported radiological consequences take no credit for containment integrity. Operator actions could include isolating valves either remote manually from the Control Room or manually at the valve location, should a fuel handling accident occur. Typically these actions are performed in a short time, measured in minutes. Therefore, there is no possibility that a delay in penetration closure will invalidate the assumptions used in the radiological consequences analyses.

Question 7:

What would be the reasons the containment penetrations would be opened during refueling and would there be controls to have the penetrations opened only as needed in the refueling?

Response:

Containment penetrations that provide direct access to the outside atmosphere from inside containment are only opened during refueling when it is necessary to support outage activities, such as testing and maintenance. Otherwise they remain closed.