

November 29, 2012

LICENSEE: Union Electric Company (Ameren)

FACILITY: Callaway Plant, Unit 1

SUBJECT: SUMMARY OF TELEPHONE CONFERENCE CALL HELD ON
NOVEMBER 5, 2012, BETWEEN THE U.S. NUCLEAR REGULATORY
COMMISSION AND UNION ELECTRIC COMPANY, REGARDING REQUESTS
FOR CLARIFICATION OF RESPONSES TO THE SEVERE ACCIDENT
MITIGATION ALTERNATIVES REQUESTS FOR ADDITIONAL INFORMATION
CONCERNING THE CALLAWAY PLANT, UNIT 1, LICENSE RENEWAL
APPLICATION (TAC. NO. ME7716)

The U.S. Nuclear Regulatory Commission (NRC or staff) and representatives of Union Electric Company (Ameren), held a telephone conference call on November 5, 2012. The purpose of the call was to discuss and clarify the staff's questions following Ameren's response to the severe accident mitigation alternatives requests for additional information for the Callaway Plant, Unit 1, License Renewal Application.

Enclosure 1 provides a listing of the participants and Enclosure 2 provides a description of the outcome of the call.

A draft of these questions was provided to the applicant prior to the call on October 23, 2012. The applicant has agreed to provide responses to the questions within 45 days of the date of this letter and has also had an opportunity to comment on this summary.

/RA/

Carmen Fells, Project Manager
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosures:
As stated

cc w/encls: Listserv

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TELEPHONE CONFERENCE CALL REGARDING CLARIFICATION
REQUESTS OF RESPONSES TO SEVERE ACCIDENT MITIGATION ALTERNATIVE
REQUESTS FOR ADDITIONAL INFORMATION CONCERNING THE
CALLAWAY PLANT, UNIT 1, LICENSE RENEWAL APPLICATION

LIST OF PARTICIPANTS
NOVEMBER 5, 2012

PARTICIPANTS

AFFILIATIONS

Jerry Dozier	U.S. Nuclear Regulatory Commission (NRC)
Carmen Fells	NRC
Garill Coles	Pacific Northwest National Laboratory (PNNL)
Bob Schmidt	PNNL
Bruce Schmitt	PNNL
Andrew Burgess	Union Electric Company (Ameren)
Sarah Kovaleski	Ameren
Justin Hiller	Ameren
Eric Thornsberry	ERIN Engineering
Steve Connor	Tetra Tech
Keith Connelly	Sciencetech
Michael Phillips	Sciencetech

TELEPHONE CONFERENCE CALL REGARDING CLARIFICATION
REQUESTS OF RESPONSES TO SEVERE ACCIDENT MITIGATION
ALTERNATIVE REQUESTS FOR ADDITIONAL INFORMATION CONCERNING
THE CALLAWAY PLANT, UNIT 1, LICENSE RENEWAL APPLICATION

The U.S. Nuclear Regulatory Commission (NRC or the staff) and representatives of Union Electric Company (Ameren) held a telephone conference call on November 5, 2012, to review clarification requests provided by the NRC following responses to the severe accident mitigation alternatives (SAMA) requests for additional information (RAIs) concerning the license renewal application.

The following request was clarified during the call, no further response is necessary.

1. RAI 1.a

The response states that for the new model, consequential loss of offsite power (LOSPs) account for 28 percent of the station blackout (SBO) frequency and only 2.5 percent of the core damage frequency (CDF). This indicates that the benefit from an SBO or LOSP mitigating SAMA should be increased to account for the omission of consequential LOSPs. Also, the impact on other SAMAs of increase in total CDF should be considered. If it is assumed that the likelihood of an SBO is the same for the consequential LOSP as it is for the LOSP initiator, the above indicates that the total SBO frequency (and therefore total LOSP frequency) is approximately 39 percent higher than the frequency due solely to the LOSP initiator alone. Incorporating this in the Rev. 4B probabilistic risk assessment (PRA) results yields an increase in CDF of $2.17\text{E-}06$ (39 percent of $5.58\text{E-}06$) or 13 percent of the SAMA baseline CDF of $1.66\text{E-}05$. The NRC staff plans to discuss this in the safety evaluation report (SER) and consider these factors in determining the cost-beneficial SAMAs. Based on current information, while several SAMAs are marginally cost-beneficial at the 95th percentile, considering the conservatism in the assessment, the staff would not consider them to be cost-beneficial. This conclusion could change due to the responses to other requests for clarifications. Clarify this information.

The following requests require written clarification from Ameren.

2. RAI 2.d

The response does not provide a response to the last portion of the RAI which states:

"Also, if the source terms for each release category are not bounding, then provide justification of how the impact of higher source term sequences are accounted for in determining the benefit of potential SAMAs, or provide a sensitivity analysis using bounding case source terms."

While the response indicates that both likelihood and potential offsite effects were considered for large early release frequency (LERF) categories, no details are provided, and further, for other release categories, the most likely sequence was chosen. Provide further justification that the source terms selected provide an adequate analysis of the benefit of each SAMA.

3. RAI 5.a

The response provides a description of National Fire Protection Association (NFPA) 805 Fire Probabilistic Risk Assessment (FPRA) results in terms of important fire areas, scenarios, and modifications identified in the 805 transition Licensing Amendment Request (LAR). The 805 LAR modifications were included as SAMAs and considered cost-beneficial. No other fire related SAMAs were considered. It is not clear if the 805 FPRA results were reviewed to determine if there would be any further modifications that might be cost-beneficial. Provide the CDF of the important fire scenarios from the NFPA FPRA. Also provide a discussion of the potential for cost-beneficial mitigation of the risk of the important fire areas and/or fire scenarios considering their contribution to the total Callaway CDF.

4. RAI 5.b

The response states:

"The 1999 internal flooding analysis used as a basis for the SAMA identified only one flood that was below the screening value used. After implementation of the internal flooding task force recommendations, this flood was considered an acceptable risk and no further actions were needed."

However, it does not discuss if the results of the current internal flooding analysis were reviewed to identify potential cost-beneficial SAMAs. The Update 5 internal flooding analysis CDF of $6.21\text{E-}06$ is sufficiently large that cost-beneficial SAMAs for important flood sequences are possible. Mitigating an internal flood scenario that has a CDF of approximately $1.1\text{E-}06$, or 18 percent of the new internal flood total CDF, would be cost-beneficial at the 95th percentile at the minimum hardware cost of \$100,000. A flood scenario with a CDF of $1.8\text{E-}07$, or 2.8 percent of the new internal flood CDF, would be cost-beneficial at the minimum procedure cost of \$15,000. Provide the CDF of the important internal flooding scenarios or sequences from the Update 5 internal flooding analysis and a discussion of the potential for their cost-beneficial mitigation considering their contribution to the total Callaway CDF.

5. RAI 6.c

A new SBO value of $7.85\text{E-}07$ compared to the earlier value (repeated value from the response to 1.a) of $4.71\text{E-}06$ is given. Neither is consistent with that inferred from SAMA 2 Case NOSBO of $2.0\text{E-}06$ (12 percent of $1.66\text{E-}05$). The elimination of SBO sequences from the SAMA model resulting from Case NOSBO should have the same percent reduction in CDF as the SBO contribution to the total SAMA model CDF. If the SBO of $7.85\text{E-}07$ is correct this is 4.73 percent compared to the Case 2 result of 12.1 percent. Provide an explanation of why the Case NOSBO reduction in CDF is different from the correct SBO contribution to the total CDF.

6. RAI 7.b

The revised response indicated that the evaluation of SAMA 186, to evaluate procedures to provide fire water to the ESW (essential service water) system, was changed from SW02 (no failure of ESW pumps) to FWCCW (add fire water as a backup source of cooling to the component cooling water (CCW) heat exchangers) and resulted in a decrease in benefit from \$635K to \$1K. It would appear that SW02 better represents the benefit of this SAMA. Justify the selection of Case FWCCW.

7. RAI 1.a

i. The SBO value given of $4.71\text{E-}6$ is different from that given in the response to 6.c of $7.85\text{E-}07$, which states that the earlier value is incorrect. Provide the correct value for the frequency of total loss of alternating current (AC) power to the station. (This item is related to RAI 6.c above.)

ii. In the last sentence of the response, clarify whether or not the internal flood induced ATWS and SBO sequences are included in the ATWS ($3.14\text{E-}7$) and SBO ($4.71\text{E-}6$) values quoted earlier in the response.

8. RAI 6.d

Case FW02 eliminates failure of all feedwater (FW) check valves and had a CDF reduction of 5.5 percent. Common cause (CC) failure of the 4 main feedwater (MFW) check valves (AEV 120 - 123) is listed along with failures of individual valves. Not listed is CC failure of 4 check valves (AEV 124 - 127) from motor-driven auxiliary feedwater (MDAFW). Results of the importance analysis appear to indicate that this later failure was included in this case since it gives the 5.5 percent results. Clarify this information.

9. RAI 6.g

The response states that:

"For SAMAs 1, 2, and 5 in addition to the TDAFW pump dependency, loss of DC impacts the availability of instrumentation. Emergency Coordinator Supplemental Guidelines exist for the use of portable generators to provide backup power on extended SBO events. This backup portable power is not credited in the PRA."

It is not clear that the availability of this backup source of power and these guidelines would reduce the benefit of SAMA 5, direct current (DC) bus cross-ties, revised to include the impact on instrumentation, to such an extent that this SAMA would not be cost-beneficial. Provide a discussion of the impact on the benefit for SAMA 5 of including the mitigation of the loss of DC instrumentation and a further justification for the evaluation of SAMA 5.

10. RAI 6.g

Relative to RCP (reactor cooling pump) seal modeling and a SAMA to use improved seals, Case RCPLOCA gives a 5.5 percent reduction in CDF for SAMAs 55, 56, and 58. This seems low compared to that for other plants and it should be different for both SAMAs 55 which include a dedicated diesel and therefore mitigates RCP seal loss-of-coolant accidents (LOCAs) for an SBO and SAMA 58 which is for new improved seals which should also be beneficial for SBOs then for SAMA 56 which does not mitigate against an SBO. The response to RAI 6.g says this case eliminates all RCP seal LOCA events that are caused by failure of seal cooling and injection except those which occur as a result of a support system initiating event such as loss of CCW. The Loss of CCW and Loss of SW (service water) add up to 1.4 percent of the CDF. Is mitigation of RCP seal failure due to loss of AC power (SBO) considered in the case? If not, justify this approach and assess the impact on the benefit of these SAMAs.

11. Table 7-1

A number of the percent reductions in offsite dose risk in Table 7-1 are given as 0.00 percent. Does this mean that there is no reduction (i.e., zero) or that it is less than 0.005 percent? For several cases where 0.00 percent is given, we believe that 0.00 percent is in error. Please provide the necessary corrections.

12. RAI 5.d

The October 18th revised response to this RAI indicated that automating the initiation of CCW flow to the residual heat removal (RHR) heat exchangers is now considered cost-beneficial with a 95th percentile benefit of \$132K and a cost of \$200K. Explain.

13. RAI 6.j

The response provides a description of SAMA Case LOCA 12 used to evaluate SAMAs 25, 26, and 39 which include passive or independently powered injection systems. The calculated benefit does not include that associated with loss of AC power. This would appear to be non-conservative for at least those SAMAs which do not rely on AC power. Discuss the impact of this non-conservatism.

14. RAI 7.a

i. The discussion of Wolf Creek SAMAs 1 and 14 indicate that the alternate emergency power system (AEPS) has a spare breaker that could be used to supply the loads in these SAMAs. Our understanding is that credit for the AEPS to supply plant loads is already included in the Callaway PRA and thus what is included in new Callaway SAMAs 187 and 188 and the resulting benefit is not clear. The analysis cases used to evaluate these SAMAs (SBOMOD and SBOMOD2) both reduce the SBO frequency due to the benefit of the added availability of AC power to certain equipment. Depending on the function of the AEPS and the definition of SBO, it is possible that if credit for the AEPS is already given it must have failed in order for there to be an SBO. Explain the credit for AEPS, the description of these SAMAs, and the benefit calculation.

ii. In the discussion of Wolf Creek SAMA 3, Case 4KV, used to evaluate the benefit of revised SAMA 11 (to prepare procedures for using existing equipment to cross-tie 4kV busses), is described as resolving SBO sequences assuming a 0.05 failure rate for the cross-tie then removing this failure event from cutsets involving failure of both emergency diesel generators. Exactly what this accomplished is not clear since all SBO sequences must involve failure of both emergency diesel generators (EDGs). Clarify this information.

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