UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 18, 2012

Mr. Adam C. Heflin
Senior Vice President and Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, MO 65251

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION ON SEVERE ACCIDENT MITIGATION ALTERNATIVES FOR CALLAWAY PLANT, UNIT 1 (TAC NO. ME7716)

Dear Mr. Heflin:

By letter dated December 15, 2011, Union Electric Company, a subsidiary of Ameren Corporation and doing business as Ameren Missouri (Ameren), submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the operating license NPF-30 for Callaway Plant, Unit 1 (Callaway) for review by the U.S. Nuclear Regulatory Commission (NRC or the staff).

The NRC staff has reviewed the severe accident mitigation alternatives (SAMA) related information in the Callaway Environmental Report (ER) and determined that additional information from the applicant is needed to complete the review. The staff's requests for additional information (RAIs) are enclosed. These RAIs were discussed with the applicant during the environmental audit performed at the Callaway site during the week of May 21, 2012. A draft document containing these requests was also sent to Ms. Sarah Kovaleski on July 3, 2012. We request that the applicant provide RAI responses within 60 days of receipt, in order to allow for completion of the SAMA inputs to the draft Supplemental Environmental Impact Statement (DSEIS).

If you have any questions, please contact me at 301-415-6337 or by e-mail at Carmen.Fells@nrc.gov.

Sincerely,

Carmen Fells

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

Docket No. 50-483

Enclosure:
Requests for Additional Information

cc w/ encl: Listserv

REQUEST FOR ADDITIONAL INFORMATION ON
SEVERE ACCIDENT MITIGATION ALTERNATIVES FOR
CALLAWAY PLANT, UNIT 1 (TAC NO. ME7716)

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the severe accident mitigation alternatives (SAMA) related information in the Callaway Plant, Unit 1 (Callaway), Environmental Report (ER) and determined that additional information from the applicant is needed to complete the review. The staff's requests for additional information (RAIs) are enclosed. The majority of these RAIs were discussed with the applicant during the environmental audit performed at the Callaway site during the week of May 21, 2012. Unless otherwise stated, table and section references are to the Callaway ER.

1. Relative to the Level 1 Probabilistic Risk Assessment (PRA):

a. Table F.3-1 appears to be a list of accident sequences contributing to core damage frequency (CDF) as it includes anticipated transient without scram (ATWS), station blackout (SBO), and reactor cooling pump (RCP) seal loss-of-coolant accident (LOCA). Provide a list of initiator event groups and their contribution to total CDF. Separately, please provide the CDF for the ATWS, SBO, and RCP seal LOCA sequences. Also confirm that the SBO frequency includes those following a loss of offsite power (LOSP) as well as those following other transients. If necessary, use an initiating event category of "Other" to ensure the list sums to the total internal events CDF.

b. The internal events CDF is given as 1.66E-05 per year on page F-11. The CDF for the apparent latest revision, Update 4B, is given as 2.61E-05 per year on page F-20. While this difference may be due to exclusion of internal flooding (9.14E-06 in Table 3-4) from the 1.66E-05 value and inclusion of it in the external events multiplier, adding this value for internal floods to the Table 3-1 value yields 2.57E-05, which is close but not equal to the 2.61E-05 value. Provide the basis for the difference in these calculated values and the rationale for the value used in the SAMA analysis. Include discussion of how initiating event contributors were accounted for in each total value.

c. Provide the truncation value used for each PRA.

d. Provide further discussion of the steps taken to ensure the technical adequacy of the Level 1 PRA subsequent to the 2000 Westinghouse owners group (WOG) peer review. Specifically include in this discussion:

    i. Further support for the disposition of peer review facts and observations (F&Os) IE-7 and ST-1 as described in Table 3-8 of the SAMA submittal.

    ii. A description of the findings of the 2006 review against the 2005 revision of the American Society Mechanical Engineers (ASME) PRA standard and the disposition of any deficiencies for the SAMA application. Attachment U of the National Fire Protection Association (NFPA) 805 Licensing Amendment

Request (LAR) provides this information relative to the fire risk application. Similar information is needed for the SAMA application including disposition of open findings.

iii. Discussion of findings from a Human Reliability Analysis (HRA) focused scope peer review. We understand from Attachment U of the NFPA 805 LAR submittal that the internal events HRA modeling has been revised and undergone a focused scope peer review. This peer review is not discussed in the SAMA submittal. Discuss the scope of this review and disposition of open findings.

e. As a result of the NRC review of the Callaway NFPA 805 submittal, NRC staff has requested the results of sensitivity analyses to show the impact of potentially unacceptable modeling approaches (see PRA RAI-08 on influence weighting factors and PRA RAI-09 on control power transformer credit). Please provide the sensitivity of these unacceptable fire PRA modeling approaches on the calculated fire CDF. If this NFPA 805 sensitivity is not bounded by the SAMA 95th sensitivity analysis provide the impact of this higher fire CDF on the SAMA evaluation.

f. Provide the freeze date for PRA Update 4B and include in your response whether there have been any changes to the plant, either physical or procedural, since that date that could have a significant impact on the results. If there have been significant changes that represent an increase in risk, provide the impact of those changes on the SAMA evaluation.

g. Table 3-2 on page F-13 includes the basic event TORNADO-T1-EVENT with a risk reduction worth (RRW) of 1.031. Please explain the basis for this event being included in the internal events PRA.

2. Relative to the Level 2 PRA:

a. The 5th bullet in Section F.3.2 indicates that the sequences that contribute to large early release frequency (LERF) were determined based on source term calculations using Modular Accident Analysis Program (MAAP) 4.0.7. Please provide the basis for the source terms for the other release categories.

b. The last paragraph in Section F.3.2 states the following: "There were no changes to major modeling assumptions, containment event tree structure, accident progression, source term calculations or other Level 2 attributes, used in the individual plant examination (IPE) Level 2 analysis, when developing the initial and updated models." Justify this statement in light of the many apparent changes discussed previously in this section and in the disposition of the Level 2 Peer Review Facts/Observations (F&Os) in Table F.3-8, or provide a discussion of the changes.

c. Provide a description of the containment event tree (CET) or trees used in the level 2 analysis including a listing and description of the CET nodes. Include a description of how phenomenological events and containment system failures are addressed in the CET.

d. Section F.3.4 identifies eight release categories. Provide further information on each release category including: category definitions and their bases, how the CET end states are assigned to release categories, a description of the sequences that are the major contributors to each release category, the basis for the selection of MAAP case used for each release category, and a description of the MAAP cases used. 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.

e. Provide a discussion of the steps taken to insure the technical adequacy of the Level 2 PRA. Include as part of your response, identification of peer reviews, gap analyses, or other reviews that were performed for the Level 2 PRA and when these reviews were performed.

f. Table 3-6 gives the importance results for LERF and Table 3-7 gives the importance results for Late Release. Since there are five LERF release categories and two late release categories, please explain which release categories were included in these assessments (i.e., all or just the largest contributor).

3. Relative to External Events:

a. Section F.3.1.2.2 states the following: "For the individual plant examination external events (IPEEE), Callaway used the Electric Power Research Institute (EPRI) seismic margins analysis (SMA) method. This analysis was transmitted to NRC in the IPEEE submittal. The latest estimate of the Callaway seismic contribution to CDF is 5.00E-6/yr."

A SMA does not normally include an estimate of seismic CDF. Please explain the source and basis for the 5.00E-6/yr value.

b. Section F.3.1.2.3 states that the risk for tornado events is 2.5E-05/yr and this is considered a contributor to the external events initiator group for calculating the external events multiplier.

i. Provide the basis for computation of this value. Include in this description consideration of buildings that are not tornado hardened and systems that could be failed by the tornado.

ii. Identify SAMAs to mitigate the contribution this makes to the total CDF.

4. Relative to the Level 3 analysis:

a. Tables F.3-9 and 3-10 provide the year 2044 population distribution used in the MELCOR Accident Consequence Code System, Version 2 (MACCS2) analysis. Since the SECPOP2000 code was utilized to develop initial residential population estimates for each spatial element within the 50 mile region based on year 2000

census data, provide the year 2000 population distribution (Table 2.6-1 provides only a partial breakdown).

b. Section F.3.4.1 identifies that the population was projected to year 2044 using county growth estimates. Please describe how the county growth rates were applied (e.g., county weighted per sector, or State average uniformly applied across all sectors). In addition, if sectors or counties were projected to have negative growth, describe how they were treated.

c. Section F.3.4.1 identifies that transient population data was included within the 10-mile radius. Provide the year 2000 transient population and identify whether the transient population was scaled to the year 2044. Briefly discuss how the year 2000 transient population was included within the 10-mile radius. If transient population was not addressed, provide the impact of accounting for transient population on the SAMA evaluation.

d. Section F.3.4.2 identifies that some generic economic data was used from NUREG-1150 and scaled using the consumer price index (CPI) to May 2010. Provide the effective cost escalation factor applied.

e. Three sector population and economic estimator (SECPOP) 2000 code errors have been publicized, specifically: (1) incorrect column formatting of the output file, (2) incorrect 1997 economic database file end character resulting in the selection of data from wrong counties, and (3) gaps in the 1997 economic database numbering scheme resulting in the selection of data from wrong counties. Address whether these errors were corrected in the Callaway analysis. If they were not corrected, then provide a revised cost-benefit evaluation of each SAMA with the errors corrected.

f. The emergency response sensitivity shows a +7 percent change for slower evacuation and a +2.4 percent change for delayed evacuation. Is the higher impact for evacuation speed due to unsheltered travel and/or exposure to "higher" initial dose releases versus early sheltering and lower delayed releases?

g. Provide the MAAP and MACCS2 (if different than MAAP) radioisotope grouping and identify the release time for early versus late release.

h. Identify the specific reference for the Callaway Evacuation Study. In your response, please discuss whether and how the evacuation time was adjusted for the difference in population between year 2045 and the year of the referenced evacuation time estimate study. If the evacuation time was not adjusted for the difference in population between year 2045 and the year of the referenced evacuation time estimate study, briefly discuss the potential impact to the SAMA evaluation. Identify whether the emergency planning zone (EPZ) was treated as a single evacuation zone.

i. Section F.3.4.5 indicates that the year 2008 meteorological data was more conservative than years 2007 and 2009. Describe the basis for this assertion and

briefly quantify the relative conservatism. In addition, please identify the meteorological tower heights (i.e. potential range of measurement elevations) for the onsite meteorology station and for the station at the Prairie Fork Conservation.

j. Provide the values and associated assumptions made about the following MACCS2 input parameters: rainfall, mixing heights, building wake effects, plume release energy, land fraction, region index, watershed index, growing season, fraction of farmland, and shielding and protection factors.

k. Table 3-15 provides ingestion doses. Identify the model(s) and version used and the critical input parameters used to produce these results.

5. Relative to the selection and screening of Phase I SAMA candidates:

a. Table F.5-1 shows that while 6 out of the 171 SAMA candidates identified are plant-specific SAMAs identified from plant-specific risk insights, it appears that the fire PRA for the recently submitted NFPA 805 LAR was not used as a source to generate plant-specific risk insights. Table F.3-4 shows that the external event contribution to total CDF is greater (e.g., fire CDF is 2.0E-5/yr) than the internal events contribution (i.e., internal CDF is 1.7E/yr). Provide identification and evaluation of SAMAs based on plant specific insights from the post-transition fire PRA. Include, as part of this identification, consideration of fire PRA importance analysis, the dominant risk fire areas and associated sequences, and the risk of modifications that Callaway has committed to. Also, describe how this information was used to identify SAMA candidates and evaluate any resulting SAMA candidates not already evaluated. When evaluating the impact of additional SAMAs consider whether the fire related SAMA can have additional benefit from non-fire contributors.

b. Section F.3.1.2.3 states the internal events PRA does not include an internal flooding modeling. However, Section F.3.1.1.2 indicates that internal flooding was included in the IPE and in a PRA update as recently as 2004. Discuss the results of the latest applicable internal flooding analysis, the differences from the IPE analysis cited for the internal flooding frequency identified in Section F.3.1.2.3 and potential internal flooding SAMAs based on the latest most applicable internal event flooding analysis.

c. Section F.5.2 states that potential enhancements identified in the IPE were included in Table F.5-1. Only four of the five enhancements identified in IPE Section 6.2.1, "Plant Improvements to be Implemented," are included in Table F.5-1 and none of the five enhancements in Section 6.2.2, "Plant Improvements to be Considered," were included. Provide the status and an evaluation of:

    i. The missing improvements from IPE Section 6.2.1, addition of procedural guidance and the required hardware to enable the operators to feed one or more steam generators with a diesel driven firewater pump; and,

    ii. The five improvements listed in IPE Section 6.2.2.

d. Note 1 to Table F.3-2 states, "The current plant procedures and training meet current industry standards. There are no additional specific procedure improvements that could be identified that would affect the result of the human error probability (HEP) calculations. Therefore, no SAMA items were added to the plant specific list of SAMAs as a result of the human actions on the list of basic events with RRW greater than 1.005." This appears to imply that meeting current industry standards is sufficient to indicate that no additional SAMAs are needed.

   i. Provide additional information to justify the conclusion stated as indicated above.

   ii. Explain the process used to make the determination that there are no opportunities to improve procedures and training. Include in the explanation how human error probability factors were considered (e.g., cognition, resources, timing, and stress level).

   iii. Discuss whether any of the risk significant operator action failures could be addressed by options other than training or procedures such as automated functions, testing, and maintenance to reduce failure or event rates, or enhanced documentation. Specifically discuss the potential for automating the function associated with basic event OP-XHE-FOCCWRHX (OPERATOR FAILS TO INITIATE CCW FLOW TO THE RHR HXS) identified in Table 3-2.

e. In Tables 3-2, 3-6, and 3-7, the SAMAs associated with the various basic events in many cases are identified by generic titles such as "Service Water SAMAs," or "Safety Injection SAMAs," rather than citing specific SAMAs that address the failure associated with the basic event. Also, these SAMA categories do not correlate to SAMA categories identified in Table 5-1. For example the categories "Service Water SAMAs," and "Safety Injection SAMAs," are not identified in the fourth column of Table 5-1. In light of this and the fact that only three SAMAs are identified in Table F.5-1 as a result of the importance analysis, the extent of the effort made to identify Callaway specific SAMAs for the important failures is not clear. Within Tables 3-2, 3-6, and 3-7, clarify which SAMA(s) address each specific basic event. Also, please provide a general description of this mapping.

f. In importance analyses Tables F.2-3, 3-6, and 3-7, some basic events are not assigned a candidate SAMA but rather with the notation that they are initiating events (i.e., IE-T3, IE-TMSO, IE-S3, IE-T2). Identify SAMAs for these initiating events that either reduce their frequency or mitigate their impact.

g. Table F.6-1 indicates that SAMA 3 (add additional battery charger or portable diesel-driven battery charger to existing direct current (DC) system) is screened out on the basis that the intent of this SAMA is met by having two spare battery chargers. This SAMA also includes a diesel driven battery charger. Clarify whether Callaway has a diesel charger that could be considered as part of candidate SAMA and evaluate if appropriate.

h. Provide additional information describing the basis for the screening of SAMA 16 (improve uninterruptible power supplies) in Table 6-1. Include explanation of what upgrades were made and for any upgrades made, identify which frontline system those uninterruptible power supplies support.

i. Clarify whether remote operation of the atmospheric steam dumps (ASDs), cited in the disposition of SAMA 40 in Table 6-1, is possible and could be credited for risk reduction using the PRA model used to perform the SAMA analysis.

j. In Table F.6-1, SAMAs 81, 82, and 83 were screened on the basis that the intent of these heating, ventilation, and air conditioning (HVAC) SAMAs was met at Callaway. In light of the fact that just one general HVAC SAMA (i.e., SAMA 80) was evaluated, please provide further justification for screening out these SAMAs.

k. In Table F.6-1, SAMA 137 (Provide capability to remove power from the bus powering the control rods) has the following Phase I disposition: "Response procedure in place." Confirm that this procedure includes removing power from the bus powering the control rods.

l. In Table F.6-1, SAMA candidate 138 (improve inspection of rubber expansion points on main condenser) is screened out as "Not Applicable" with the disposition that, "No risk significant flooding sources identified in the turbine building." Although the current internal events PRA is stated not to include analysis of internal flooding, the Callaway IPE indicates that internal flooding contributed 31 percent to internal events CDF. Clarify whether this flooding source is possible and whether it can be risk significant. If it can, provide an evaluation for this SAMA.

m. In Table F.6-1, SAMA 141 (provide additional restraints for carbon dioxide (CO_2) tanks) is combined with other seismic SAMAs (i.e., 154, 155, 156, 157, 158, and 159). None of these SAMAs address this specific issue. Justify why these SAMAs are combined or evaluate them separately.

n. In Table F.6-1, SAMA candidate 144 (install additional transfer and isolation switches) for reducing the potential for spurious actuation during a fire is screened out as "Intent Met" based on modification commitments made in the NFPA 805 LAR submittal. NFPA 805 LAR Attachment S does identify such an item (i.e., Item 07-0151 - Install redundant fuses and switches to prevent multiple spurious actions from stopping or starting safety equipment). However, this modification is specific to selected cables in the Main Control Room to Train B fed from NB02. Justify or evaluate other modifications that would reduce spurious actuations during a fire.

o. Table 5-1 includes in Note 1 SAMA identification sources to include "D. Expert panel convened to review SAMA analysis." Section 5.5 of the LRA states that "The Callaway plant staff provided plant specific items that were included in the evaluation." Describe this activity in more detail, identifying the individuals involved and how the review was conducted. In addition, please clarify whether the "Expert Panel" was a formal panel or several individuals reviewing material individually.

6. With regard to the Phase II Cost-Benefit Evaluations:

a. Provide the percent reduction in off-site economic cost risk (OECR) for each SAMA evaluated in Table F.7-1 and any other SAMAs evaluated in response to RAIs.

b. ER Section F.7.2 indicates that an expert panel developed the implementation cost estimates for each of the SAMAs. Describe the level of detail used to develop the cost estimates (i.e., the general cost categories considered). Also, clarify whether the cost estimates accounted for inflation, contingency costs associated with unforeseen implementation obstacles, replacement power during extended outages required to implement the modifications, and maintenance and surveillance costs during plant operation.

c. Confirm which CDF value and contributors (e.g., internal and external) were used to calculate the risk reduction values presented in Table F.7-1. Table F.7-1 presents the reduction in CDF for SAMA 2 as 12.17 percent. This is evaluated as eliminating SBO events. Table F.3-1 presents a value for SBO that is 28 percent of the total. Please explain this discrepancy.

d. Clarify modeling assumptions used for SAMA cases in which failures are eliminated (e.g., service water pumps) by indicating which failures were eliminated including whether this includes support failure (e.g., mechanical failure of service water pumps and support failures such as alternating current (AC) power supply to service water pumps).

e. For certain Phase II SAMAs listed in Table F.7-1, the information provided does not sufficiently describe the associated modifications to clearly identify what is included to justify the cost estimates. Provide a more detailed description of the modifications and cost estimates for SAMAs 11, 15, 64, 94, 104, 116, 163, and 164.

f. For certain Phase II SAMAs listed in Table F.7-1, the calculated benefit does not seem consistent with the percent reduction in CDF or off-site dose or there was no CDF or off-site dose information to compare to the calculated benefit. Provide corrections or more justification for the benefit calculated for SAMAs 39, 160, 161, 162, 163, 164, and 171.

g. In Table 7-1, SAMA 1 (add additional DC battery capacity) is evaluated by eliminating turbine driven auxiliary feed water (TDAFW) pump dependency on DC power while SAMA 2 (replace lead-acid batteries with fuel cells) is evaluated by eliminating all SBO. For SAMA 1 and SAMA 5 (provide DC bus cross ties also evaluated by eliminating the TDAFW pump DC dependency), describe whether the TDAFW pump availability is the only impact of the loss of DC. Both SAMAs 1 and 2 extend DC power availability during SBO. Explain the reasons for the different evaluations that do the same thing.

h. SAMA 15 (install tornado protection on gas turbine generator) is evaluated by SAMA case LOSP1 which is described as leading to no tornado LOSP events. Given Callaway has alternate emergency power system (AEPS) diesel generators rather

than a gas turbine, clarify the model changes made and their applicability to this SAMA.

i. In Table F.7-1, SAMA 24 (bury off-site power lines) is shown as costing >$3M and as not being cost beneficial. However, the potential benefit of this SAMA is high ($1.2M) and the estimated cost of this SAMA reported in the Seabrook ER (a recent Westinghouse PWR-4 submittal) is lower (>$1M). Provide a more detailed description of this modification and additional justification for the estimated cost.

j. Provide additional information on the changes made for SAMA Case LOCA12 used to evaluate SAMAs 25, 26, and 39. Describe what modeling change was made to eliminate failures of the charging or SI pumps. Include as part of this description whether these assumed failures are limited to LOCAs or if they include failure due to loss of AC.

k. Provide additional information on the changes made for SAMA Case LOCA03 used to evaluate SAMA 28. Describe what modeling change was made to eliminate failures of the low pressure pumps. Include as part of this description whether these assumed failures are limited to LOCAs or if they include failure due to loss of AC.

l. In Table F.7-1 the benefit for SAMA 39 appears to be excessively high (i.e., $748K) when compared to other similar SAMA benefits. Provide corrections as needed.

m. Table F.7-1 indicates that SAMA 46 (add a service water pump) was modeled by assuming there were no failures of essential service water (ESW) pumps. Clarify whether modeling of this SAMA case includes ESW pump unavailability due to test and maintenance.

n. In Table F.7-1, SAMA 94 (install a filtered containment vent to remove decay heat) is shown as >$2M and as not being cost beneficial. However, the potential benefit of this SAMA is high ($1.2M) and the estimated cost of this SAMA reported in the Seabrook ER is lower (>$500K). Provide a more detailed description of this modification and additional justification for the estimated cost.

o. In Table F.7-1, SAMA 113 (increase leak testing of valves in interfacing systems (IS) LOCA paths) is shown as costing >$1M and as not being cost beneficial. However, the potential benefit of this SAMA is moderate ($123K) and the cost of this SAMA seems high, as it does not require hardware modification. The Seabrook ER reports an estimated cost of >$100K for this SAMA. Provide a more detailed description of this modification and additional justification for the estimated cost

p. In Table F.7-1, SAMA 119 (institute a maintenance practice to perform a 100 percent inspection of steam generator tubes during each refueling outage) is shown as costing >$3M and as not being cost beneficial. However, the potential benefit of this SAMA is high ($1.2M) and the cost of this SAMA seems high, as it does not require hardware modification. The Seabrook ER reports an estimated cost of >$500K for this SAMA. Provide a more detailed description of this modification and additional justification for the estimated cost.

q. Section F.11 states that the RCPLOCA modeling case "allows evaluation of various possible improvements that could reduce the risk associated with RCP seal LOCA and other small LOCA events." As for other SAMA cases, provide a description of the specific modeling assumptions made to determine the percent reduction in CDF and off-site dose.

r. Section F.8.2 indicates that the uncertainty factor used for the ratio of the 95th percentile value to the mean value of the CDF is 2.11. In Table F.8-1, the ratio of the base cost benefit to the 95th percentile case for SAMAs 91, 93, and 94 appears to be low (i.e., 1.4). Please explain this apparent discrepancy, or if this is a mistake, recalculate the 95th percentile benefit for these three SAMAs.

s. Table F.7-1 reports the baseline benefit for SAMA 136 to be $53K, whereas Table F.8-1 reports this value as $63K. Provide corrections as needed.

t. Table F.7-1 reports a 95th percentile benefit for SAMA 24 as 2.4M but should be 2.5M. Provide corrections as needed.

u. The NRC staff has been unable to find a description for SAMA case CST01 identified in Tables F.7-1 and F.8-1 of Section F.11. As for the other SAMA cases, provide a description of the case and the specific modeling assumptions made to determine the percent reduction in CDF and off-site dose.

v. The Section F.11 Annex defines SAMA case "HVAC" as eliminating various HVAC dependencies. Identify which HVAC systems this applies to and how the benefit was calculated. Also, confirm which dependencies this applies to.

7. With regard to Alternative SAMAs:

a. A note at the end of Table F.5-1 indicates that recent industry submittals of like-kind plants (i.e., Wolf Creek, South Texas, Diablo Canyon, and Seabrook) were used as a source of candidate SAMAs. The extent to which these submittals were examined is not clear, as only two SAMA candidates were identified in Table F.5-1 as being from these sources (i.e., SAMA 162 and 165). Also, it appears that a cost beneficial SAMA identified in the Diablo Canyon submittal might represent an unevaluated SAMA candidate for Callaway (i.e., SAMA 24 – Prevent clearing of RCS cold leg water seals). Describe the extent to which the four cited SAMA submittals were used as sources to generate candidate SAMAs and evaluate each SAMA determined to be cost beneficial in those submittals or show how they could be screened out using criteria presented in ER Section F.6.0. If the SAMA review for a submittal has been completed, use the cost beneficial SAMAs as reported in the respective site specific volume of NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants."

b. SAMA 64 (implement procedure and hardware modifications to allow manual alignment of the fire water system to the component cooling water system, or install

a component cooling water header cross-tie) is evaluated by eliminating CCW pump failures. Consider a similar SAMA that provides fire water to the ESW system.

c. Table 7-1 indicates that elimination of all HVAC dependencies for SAMA 80 results in a 6 percent reduction in CDF. The individual HVAC failures listed in Table 3-2 appear to involve unrelated pieces of equipment in various rooms or buildings. Discuss the possibility of lower cost alternatives that address the more important contributors to CDF. Note that two of the above cited failures (VD-FAN-FR-CGD02A and -CGD02B) appear to be the reason for SAMA Case HVAC02 described on Page F-109. This case is not used in the Phase II analyses described in Table 7-1.

July 18, 2012

Mr. Adam C. Heflin
Senior Vice President and Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, MO 65251

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION ON SEVERE ACCIDENT MITIGATION ALTERNATIVES FOR CALLAWAY PLANT, UNIT 1 (TAC NO. ME7716)

Dear Mr. Heflin:

By letter dated December 15, 2011, Union Electric Company, a subsidiary of Ameren Corporation and doing business as Ameren Missouri (Ameren), submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the operating license NPF-30 for Callaway Plant, Unit 1 (Callaway) for review by the U.S. Nuclear Regulatory Commission (NRC or the staff).

The NRC staff has reviewed the severe accident mitigation alternatives (SAMA) related information in the Callaway Environmental Report (ER) and determined that additional information from the applicant is needed to complete the review. The staff's requests for additional information (RAIs) are enclosed. These RAIs were discussed with the applicant during the environmental audit performed at the Callaway site during the week of May 21, 2012. A draft document containing these requests was also sent to Ms. Sarah Kovaleski on July 3, 2012. We request that the applicant provide RAI responses within 60 days of receipt, in order to allow for completion of the SAMA inputs to the draft Supplemental Environmental Impact Statement (DSEIS).

If you have any questions, please contact me at 301-415-6337 or by e-mail at Carmen.Fells@nrc.gov.

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

Docket No. 50-483

Enclosure:
Requests for Additional Information

cc w/ encl: Listserv

DISTRIBUTION: See next page

ADAMS Accession No.:ML12180A022

OFFICE	LA:RPB2:DLR	PM:RPB2:DLR	BC:AADB:DRA	BC:RPB2:DLR
NAME	IKing	CFells	TTate (JDozier for)	DWrona
DATE	7/9/12	7/12/12	7/17/12	7/18/12

OFFICIAL RECORD COPY

Letter to Mr. Adam C. Heflin from Carmen Fells dated July 18, 2012

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION ON SEVERE ACCIDENT MITIGATION ALTERNATIVES FOR CALLAWAY PLANT, UNIT 1 (TAC NO. ME7716)

DISTRIBUTION:

E-MAIL:
PUBLIC
RidsNrrDlrResource
RidsNrrDlrRpb1 Resource
RidsNrrDlrRpb2 Resource
RidsNrrDlrRarb Resource
RidsNrrDlrRapb Resource
RidsNrrDlrRasb Resource
RidsNrrDlrRerb Resource
RidsNrrDlrRsrg Resource

DWrona
TTate, DRA
JParillo, DRA
AHon, DORL
DMcIntyre, OPA
MSpencer, OGC
AGhosh, OGC
BMaier, RIV
NOKeefe, RIV
THartman, RIV
ZHollcraft, RIV
VDricks, RIV
LUselding, RIV
Sarah Kovaleski [s.kovaleski@ameren.com]