AmerenUE
Callaway Plant

PO Box 620
Fulton, MO 65251

July 10, 2008

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop P1-137
Washington, DC 20555-0001

ULNRC-05520

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT
UNION ELECTRIC COMPANY
ONE-TIME COMPLETION TIME EXTENSION
FOR ESSENTIAL SERVICE WATER (ESW) SYSTEM
(OL1282 - TAC NO. MD7252)

References:
1. ULNRC-05445 dated October 31, 2007
2. ULNRC-05476 dated February 21, 2008
3. ULNRC-05482 dated March 7, 2008
4. NRC Request for Additional Information dated March 31, 2008
5. ULNRC-05500 dated May 6, 2008
6. NRC Request for Additional Information (RAI) Letter from Mohan C. Thadani to Charles D. Naslund dated June 10, 2008

In Reference 1 above AmerenUE requested a license amendment that would revise Callaway Technical Specification (TS) 3.7.8, "Essential Service Water (ESW) System," and TS 3.8.1, "AC Sources – Operating" to allow a one-time Completion Time extension from 72 hours to 14 days per ESW train to be used prior to December 31, 2008, for replacing underground ESW piping.

From the NRC's ongoing review of the subject license amendment request (LAR), several requests for additional information (RAIs) have been transmitted to AmerenUE, to which AmerenUE has responded except for the most recent request. Per Reference 2, AmerenUE responded to eight questions that were received electronically from the NRC's Probabilistic Risk Analysis (PRA) Licensing Branch on January 16, 2008. Per Reference 3, AmerenUE responded to four questions received electronically from the Electrical Branch on February 7, 2008. Via Reference 4, the NRC formally transmitted four follow-up PRA questions that were previously received electronically by AmerenUE on March 20, 2008. (The RAI letter of Reference 4 incorporated several editorial changes that had been made to the electronically provided RAI questions.) AmerenUE subsequently responded to the

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Reference 4 RAI letter via its letter identified as Reference 5, but an additional RAI was prepared by the NRC and recently transmitted via the letter of Reference 6.

In response to the RAI letter of Reference 6, AmerenUE hereby provides the information contained in the attachments to this letter. Specifically, Attachment 1 to this letter contains the responses to the additional comments and questions from the NRC that were attached to Reference 6 as Enclosures 3, 4, and 5. The responses to Enclosures 1 and 2 of Reference 6 are being transmitted under a separate cover letter, i.e., AmerenUE letter ULNRC-05517. Attachment 2 to this letter provides a revised list of commitments associated with the requested license amendment. This list supersedes the list previously transmitted as Enclosure 4 to Reference 5 above.

In responding to Enclosure 4 of Reference 6, Attachment 3 to this letter provides the requested changes to TS 3.8.1 Required Action B.4 (as partially revised relative to the proposed changes provided per Reference 1). Consistent with the proposed changes, Attachments 4 and 5 to this letter provide retyped TS pages and corresponding TS Bases changes, respectively, which reflect removal of the proposed changes to the second Completion Time that were based on traveler TSTF-439-A. Attachment 5 is provided for information only. Final TS Bases changes will be processed under Callaway's program for updates per TS 5.5.14, "Technical Specifications Bases Control Program," when the requested amendment is implemented.

The changes to TS 3.7.8 and associated TS Bases in Attachments 2 and 4 of Reference 1 and the retyped TS pages, through page 3.7-42, in Attachment 3 of Reference 1 remain, unchanged, within the scope of this license amendment request. The only TS changes in this transmittal are those included herewith to TS 3.8.1 in Attachment 3.

It has been determined that the nature of the TS changes contained in Attachment 3 does not invalidate the findings of the licensing evaluations contained in Attachment 1 of Reference 1. This amendment application does not involve a significant hazard consideration as determined per 10CFR50.92 nor is there a requirement to prepare an environmental impact statement or environmental assessment. The Callaway Onsite Review Committee has reviewed and approved the attached TS and Bases revisions.

It should be noted that the new risk information provided in the attached falls within Region II of Regulatory Guide 1.174, Figures 3 and 4, for delta-CDF and delta-LERF. In addition, it should be noted that in response to Enclosure 5, AmerenUE has quantified the effect on the previously reported risk results with respect to the commitment regarding alternate AC power contained in the response to question 2.b of Reference 3.

If you have any questions on this letter or its enclosures, please contact Mr. Scott Maglio at (573) 676-8719.

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

Very truly yours,

Executed on: 7/10/08

Mark A. McLachlan
Manager – Engineering Services

GGY/nls

Attachments: 1 – Responses to PRA Branch RAI Questions and Responses
2 – Summary of Regulatory Commitments
3 – Markup of Technical Specifications
4 – Retyped Technical Specifications
5 – Proposed Technical Specification Bases Changes (for information only)

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ATTACHMENT 1

RESPONSES TO PRA BRANCH RAI
QUESTIONS AND RESPONSES

OFFICE OF NUCLEAR REACTOR REGULATION
REQUEST FOR ADDITIONAL INFORMATION
RELATED TO ESSENTIAL SERVICE WATER
UNION ELECTRIC COMPANY
CALLAWAY PLANT
DOCKET NO. 50-483

NRC Introduction

The NRC's Division of Safety Systems staff has reviewed the information provided in your submittal and determined that additional information is required in order to complete its review. Please provide a response to the following request for additional information (RAI) questions by July 10, 2008, to facilitate the continuation of the review by the NRC staff.

AmerenUE Introduction

The NRC questions below refer only to the original amendment application submitted by AmerenUE (i.e., AmerenUE letter ULNRC-05445 dated October 31, 2007). Discussion/information that was provided in subsequent docketed correspondence from AmerenUE in regard to the application, and which serves to address the NRC questions, is pointed out in the responses below, as applicable.

In AmerenUE's October 31, 2007 amendment application, reference is made to the license amendment request that was submitted for Catawba as a precedent request approved by the NRC. Notwithstanding the PRA modeling differences that have subsequently been pointed out by the NRC's PRA Branch with respect to external events between Callaway and Catawba, the information provided in ULNRC-05445 with respect to RG 1.177, Regulatory Position C.2.2, "Traditional Engineering Considerations," is not risk-based and was taken directly from the NRC Staff's Safety Evaluation for the Catawba amendment. The information that was provided was confirmed to be applicable for Callaway's design and the intended replacement of underground ESW piping, notwithstanding Catawba's multiple one-time Completion Time extensions for ESW inspection and repair.

Question:

1. Attachment 1, page 5 of 22, "Need for Change"

   The licensee states: "Performing the connection of the new PE [polyethylene] ESW [essential service water] piping with the rest of the ESW system during Refuel 16 could be contrary to safety since proper management and project coordination are more difficult during an outage setting.....If this work is performed outside the outage, as requested by way of this one-time Completion Time extension, it can be done with the full emphasis of the plant staff brought to bear on the modification and with the full complement of heat removal systems available during normal power operation."

   Explain how performing the connection as stated above during Refuel 16 could be contrary to safety since proper management and project coordination are more difficult during an outage setting.

Response:

Jobs currently planned for Refuel 16 (fall 2008) include thousands of jobs dealing with corrective maintenance, elective maintenance, modifications, Technical Specification surveillances, EQ preventive maintenance, safety-related preventive maintenance, etc., and the Workman's Protection Assurance (WPA) tagging and tag clearances for all of the above.

When consideration is given to the typical scope of work done during a refueling outage, AmerenUE maintains that doing the ESW piping connection during a one-time 14-day LCO outage with the reactor online would be a more controlled evolution since the plant management and work force resources will be prioritized to focus on this modification. This leads to enhanced attention to detail, better and more effective work controls, and, consequently, a more efficient and safe work situation. The response to NRC Enclosure 5 (Part III) also provides additional justification that supports a separate LCO outage for this modification.

During the project meeting with NRC that was held on July 1, 2008, the following additional discussion was provided.

The Refuel 16 outage scheduling milestones have progressed to the point where including the connection of the new HDPE underground piping to the rest of the ESW system during the refueling outage would be a major impact on the performance of Refuel 16. Modification scope is identified 20 months prior to the refueling outage. Outage organization manning and the ability to address emergent issues that may arise during the ESW modification support the performance of this work during an LCO outage as opposed to adding this late scope change to Refuel 16.

The following is a summary of the Refuel 16 major work scope.

RCPs
Backseating RCPs
'B' Seal Inspection/Replacement
Flywheel inspections

Major Pump Work
'A' Main Feedwater Pump Overhaul
'A' Condensate Pump – Change rotating element
PAL02 – Overhaul Pump
KFC02 – MPE-FC-QK001 (oil change, etc.)

Major Motor Work
DPAF01A - 'A' HDP
DSGN01C – 'C' Containment Cooler Motor
DPAD01A – 'A' Condensate Pump
DPAF01A – 'A' Heater Drain Motor

Major Valve Work
ABHV0012, 15, 18, 21 – Rebuild Valve & Actuator
ABV0139 – Replace B-B gasket
AEFV0039, 41 – Inspection/Replace Seat Rings

Eddy Current Testing
EAD01C
EAE01A, 1B, 2B

Other Major Safety Scope
'A' ESW Piping Replacement (Critical Path)
'B' CCW Heat Exchanger Maintenance/Repair (Critical Path)
TJE01B – Tank Inspection
A/B Diesel Inspections
KKJ01A – Injector Pump Removal/Installation
CTMT Cooler Cleaning

Other Major Secondary Scope
AEFE0001 – Remove flow element & inspect for wear
AEFE0002 – Remove flow element & inspect for wear
PFC01B – Replace check valves in lube oil reservoir

Outside Power Block
Inspect Cooling Tower

Fuel Related
Ultrasonic Cleaning
Inmast Sipping/ possible fuel defect repair

Switchyard
A & B Bus Outages for CCVT Replacements
MDV55 – Breaker Timing and Run Down
Overhaul

Major Transformers
XMR01 (Backfeed) – Replace Bushings
XNB01 – Replace PT Transformers
XNB02 – Inspect & Clean
XPB03 – Inspection

Major Electrical Bus Outages
NB01 – Repair Rosette on NB0112
NG04C – Breaker Work
PG13Q/R – Clean/Inspect
PG11/11K/11J – Clean/Inspect
PG19/19G/19N – Clean/Inspect
PG20/20G – Clean/Inspect
PG17 – Relay Work
PG25 – PA0105 work

Batteries
NK11, 12, 13, 14 – Inspections
PJ11 – Inspection

Major Breakers
PA0106 - Inspect PG1301 – Inspect
PA0107 - Inspect PG1306 – Inspect
PA0108 - Inspect PG1101 - Inspect
PA0101 - Inspect PG1107 – Inspect
PA0110 - Inspect PG1901 - Inspect
PA0201 - Inspect PG2001 - Inspect
PA0202 – Inspect PG2008 – Inspect

Modifications
MP 07-0067 – small/medium bore ESW piping replacement
MP 07-0007 – reroute exhaust from pressurizer PORVs to PRT
MP 04-3005 – chrome moly pipe replacement to address flow accelerated corrosion concerns
MP 07-0033 – modify turbine oily waste drains
MP 06-0070 – replace PN07B & PN08B

MP 98-1042 – KAFV0029, Replace ASCO solenoid valve
MP 08-0012 – replace EATV0007 (Health Risk EA 07-05)

Programs
AOVs – 30 to be tested/worked
MOVs – 17 to be tested/worked
Local Leak Rate Tests – 22
Relief/Safeties – 12 Primary Reliefs
Check Valves - 5 Check Valve IST (disassembly), 22 Check Valve IST (non-intrusive)

Question:

2. Attachment 1, page 6 of 22, "Evaluation of Safety Margins"

   The licensee states: "...however, the proposed design will result in improved ESW system performance and enhanced system reliability, and will satisfy the criteria of 10 CFR 50.55a (a)(3)(i) ..."

   Describe the improved ESW system performance resulting from the replacement of existing steel ESW piping during the one-time completion time extension.

Response:

Implementation of the proposed design change is expected to result in improved performance of the ESW system after the modification is completed and the ESW system is returned to service. The performance issues to be addressed by this modification are discussed in Attachment 1, pages 4 and 5, to ULNRC-05445. That information is repeated below.

> "In order to address an identified plant health risk tracked for the ESW system (with a designation number EF-03-07), which has manifested itself in numerous pinhole leaks and other localized degradation of the ESW piping due to microbiologically induced corrosion (MIC), a decision has been made to replace the buried ESW carbon steel ASME Class 3 piping with piping using polyethylene (PE) material. Replacement of the current steel ESW piping with PE piping would provide an overall benefit to plant safety since PE piping is much more resistant to fouling and MIC, thus assuring improved long-term reliability of the risk-significant ESW system.
>
> The Callaway ESW system was originally designed with unlined carbon steel piping. Plant-specific and industry operating experience has shown that carbon steel piping is susceptible to fouling, corrosion, and MIC for raw water applications.

> The use of corrosion resistant steel piping provides added resistance to these problems, but does not eliminate susceptibility. Alternatively, the use of internal linings or coatings in carbon steel piping provides resistance to these problems. However, degradation of and/or damage to the linings and coatings can cause exposure of the carbon steel piping to the raw water, resulting in piping degradation. Additionally, the linings and coatings can pose a potential foreign material concern if they are released from the piping wall as a result of the degradation or damage.
>
> Polyethylene piping pipe will not rust, rot, pit, corrode, tuberculate, or support biological growth. The use of polyethylene piping in raw water applications will thus ensure long term reliability from a structural integrity and flow standpoint.
>
> Callaway has recently installed approximately 600 linear feet of 36-inch diameter buried polyethylene piping in a non-safety related blowdown application and has not experienced any significant problems. On a larger scale, Duke Power Company has installed 20,000 linear feet of polyethylene piping at Catawba Nuclear Station in non-safety related raw water applications. Since the installations began in 1998, Duke Power Company has reported that the material has had an excellent service history and has not experienced fouling or corrosion."

In addition, this was addressed in the presentation given to the NRC during the project meeting conducted on January 23, 2008. (Refer to ADAMS Accession Number ML080380647 for the meeting minutes dated February 29, 2008, and to ADAMS Accession Number ML080250405 for the presentation slides used in the January 23 meeting). Slide 6 of the presentation slides particularly shows the relatively degraded (yet operable) state of the currently installed underground ESW steel piping.

During the public meeting with the NRC staff that was held on July 1, 2008, the following additional discussion was provided.

The benefits and advantages of using the high density polyethylene (HDPE) piping include leak-free fully restrained joints, corrosion and chemical resistance, seismic resistance, construction advantages, durability, and hydraulic efficiency that doesn't decline over time. Reference is again made to ADAMS Accession Number ML080250405 – slides 9 and 10 provide additional details under the above subject headings.

Question:

3. Attachment 1, page 7 of 22, "Defense in Depth," Bullet 1

   The licensee states: "Preserving the operability of one ESW train and serving

the inoperable ESW train's loads from the normal service water system during this portion of the 14-day Completion Time will maintain the balance among the prevention of core damage, prevention of containment failure, and consequence mitigation."

With the emphasis on consequence mitigation, briefly explain how the balance as stated above is maintained for the ESW one-time completion time extension.

Response:

One complete ESW train will be maintained in an OPERABLE status. There is no requirement to assume a single failure while operating under a Technical Specification (TS) Required Action; therefore, there will be no effect on the analysis of any accident or that accident's progression since the OPERABLE ESW train is capable of serving 100% of all the required heat loads. As such, there is no impact on consequence mitigation for any transient or accident.

In addition, normal service water will be available for a significant portion of the 14-day LCO outage to supply the out-of-service ESW train's loads. See the commitments in Attachment 2 and the estimated times that normal service water would be unavailable for both trains of ESW. This will reduce risk by making equipment cooled by the out-of-service ESW train available for various ESF mitigation functions in the event the protected ESW train were to fail. This is discussed in greater detail in the response to Enclosure 5 of the June 10, 2008 RAI.

Question:

4. Attachment 1, page 7 of 22, "Defense in Depth," Bullet 2

The licensee states: "The proposed extension of the Completion Time (11-day increase to 14 days per ESW train VS. the current 3-day Completion Time) results in a corresponding increase in the amount of time that the redundancy that is normally afforded by the other (inoperable) ESW train will not be available, thereby increasing the amount of time that safety systems are vulnerable to single failures. However, as discussed above, the normal service water (EA) system will be cross-connected to supply the inoperable ESW train loads during a portion of the extended Completion Times for each train, although the pumped flow from the normal service water system would be unavailable if a loss of offsite power were to occur during this 14-day Completion Time. Steps will be taken to minimize the likelihood of losing offsite power during the use of this one-time Completion Time extension."

Given that "a loss of offsite power is the most relevant concern for this amendment request" (Attachment 1, page 13 of 22), state the diverse types of

steps that will be taken to minimize the likelihood of losing offsite power during the use of this ESW one-time completion time extension.

The licensee also states: "Compensatory measures discussed under Tier 2 in Section 4.0 of this Evaluation include programmatic activities. However, because this is a one-time change of limited duration, some use of programmatic activities can be credited for minimizing the risks involved and for maintaining defense-in-depth."

Describe the programmatic activities that can be credited for minimizing the risks involved and for maintaining defense-in-depth for the ESW one-time completion time extension.

Response:

The requested discussions have been provided in previously docketed correspondence. See ULNRC-05482 dated March 7, 2008 (response to RAI 2.b) which committed AmerenUE to bringing in four temporary diesel generators for Callaway to serve as an alternate AC power supply, as well as the Tier 2 commitments provided in Enclosure 4 to ULNRC-05500 dated May 6, 2008 (updated herein by Attachment 2). Those Tier 2 commitments are programmatic in nature since they are implemented in accordance with Callaway's Configuration Risk Management Program (in accordance with Callaway procedure APA-ZZ-00315 as discussed on page 15 of Attachment 1 to ULNRC-05445) and Commitment Management Program (in accordance with Callaway procedure APA-ZZ-00540). The purpose of the Tier 2 commitments is to provide additional defenses for the OPERABLE ESW train during the LCO outage and to minimize risk in both qualitative and quantitative terms. For the latter, risk quantification efforts associated with the Tier 2 commitments have credited:

- reduced loss of offsite power frequency by imposing access controls on the switchyard and other areas where activities could initiate a loss of offsite power;

- not allowing work on PRA-important equipment subject to the limitations discussed in Attachment 2 to this submittal;

- continuous, 1-hour, and 8-hour fire and flood watches;

- removal of transient combustibles, verification that protected train drains are unobstructed, verification that protected train watertight doors are closed and functional, and verification of the availability of fire detection and suppression equipment;

- administrative control commitment to impose a plant shutdown if the normal charging pump becomes non-functional during the 14-day LCO outage;

- temporary diesel generators to provide an alternate AC power source.

Attachment 2 of this submittal contains changes to the Tier 2 commitment list with respect to definitive actions to be taken if an emergent condition were to render either the turbine-driven auxiliary feedwater pump (TDAFP) inoperable or the normal charging pump (NCP) non-functional during the 14-day LCO outage.

Question:

5. Attachment 1, page 8 of 22, "Defense in Depth," Bullet 4

   The licensee states: "As discussed in the previous bullet, compensatory measures will be established to assure the availability and capability of redundant, independent, and diverse means of accomplishing critical safety functions during the one-time proposed completion time extension."

   Briefly discuss the sufficiency of the redundant, independent, and diverse means that will be maintained by established compensatory measures in accomplishing critical safety functions during the ESW one-time proposed completion time extension.

   The licensee also states: "As such, appropriate measures will be taken to preserve defenses against potential common cause failures and no new common cause failure mechanisms will be introduced."

   Briefly explain how compensatory measures will be taken to preserve defenses against potential common cause failures and to not introduce new failure mechanisms during the ESW one-time completion time extension.

Response:

AmerenUE will maintain one complete ESW train in an OPERABLE status during each train's 14-day LCO outage such that the OPERABLE train is capable of serving 100% of the required post-accident heat loads. No new loads are being placed on the ESW system, only a change in piping material. No new functionality requirements are being imposed on the ESW system. Post-modification hydrostatic testing will confirm the readiness to return the ESW system to operation. There is nothing that will be allowed by the Completion Time extension that would impact the protected ESW train's availability.

AmerenUE will bring in four temporary diesel generators that will be capable of powering the protected train's electrical loads in the event of a loss of offsite power and if the station's OPERABLE standby diesel generator were to fail to start and run when called upon. The 14-day LCO outage will not be entered if severe weather is forecast. AmerenUE will not voluntarily work on PRA-modeled equipment other than the out-of-service ESW train and its supported systems (during the time when normal service water is unavailable to supply the out-of-service ESW train's loads) and AmerenUE will not voluntarily work on PRA-modeled equipment in either train when normal service water is available to supply the out-of-service ESW train's loads, subject to the conditions listed in Attachment 2 to this letter. AmerenUE will restrict switchyard access to operator rounds (no equipment manipulation) and readiness checks associated with the temporary diesel generators. Access will be restricted to the switchyard, TDAFP, NCP, and condensate storage tank; also discussed further in Attachment 2.

In summary, the following will be ensured or maintained:

- One OPERABLE (100% capacity) ESW train, which is completely redundant to and independent from the ESW train being taken out of service for the modification,

- For the OPERABLE ESW train, power sources that are

  redundant to and independent from the standby diesel generator that serves the out-of-service ESW train

  or

  diverse from the power block system via temporary diesel generators that can be connected into the power supply system,

- The complete array of Tier 2 commitments identified in Attachment 2.

Therefore, there will be adequate defenses taken against the potential for common cause failures (which is the topic of the 4th bullet on Attachment 1, page 8).

OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR ADDITIONAL INFORMATION

RELATED TO ESSENTIAL SERVICE WATER

UNION ELECTRIC COMPANY

CALLAWAY PLANT

DOCKET NO. 50-483

The NRC's Division of Inspection and Regional Support staff has reviewed the information provided in your submittal and determined that additional information is required in order to complete its review. Please provide a response to the following request for additional information question by July 10, 2008, to facilitate the continuation of the review by the NRC staff:

Question:

1. In the licensee's request for a one-time TS change to extend the allowed outage time from 72 hours to 14 days, the "note" added should make it clear that the second completion time under the limiting condition for operation in the TS will not apply for the planned plastic pipe installation only, and that the change does not constitute permanent removal of the second completion time.

Response:

This change from approved industry traveler TSTF-439-A, which was incorporated into Revision 3.1 of STS NUREG-1431, has been withdrawn from this amendment application. Attachments 3-5 contain the revised TS and Bases markups.

OFFICE OF NUCLEAR REACTOR REGULATION

INFORMATION INADEQUACIES IN PREVIOUS RAI RESPONSES

RELATED TO ESSENTIAL SERVICE WATER

UNION ELECTRIC COMPANY

CALLAWAY PLANT

DOCKET NO. 50-483

The NRC'S Division of Risk Assessment staff has reviewed the licensee's responses to the NRC staff's request for additional information (RAI) regarding consideration of incremental risk.. In RAIs dated March 31, 2008 (ADAMS Accession No. ML080880012), the staff requested additional information regarding a qualitative or quantitative analysis of the risk of internal floods and fires during the extended emergency [sic] service water (ESW) outage sufficient to demonstrate that the risk (i.e., core damage frequency and large early release frequency) from these initiators, omitted from the quantitative risk results, is not significant. In your response dated May 6, 2008 (ADAMS Accession No. ML081340561), the licensee stated that the conditional core damage probability for floods and fires during the ESW outage could approach 1.0.

Based on this information, the staff cannot conclude that the plant risk due to floods and fires is not significant for this application. The information provided would indicate that the risk from fires and internal floods may in fact be dominant compared to the internal events risk. In order to resolve this issue, the licensee would need to demonstrate, through a rigorous quantitative analysis of flood and fire risk, that the total risk during the extended ESW outage (i.e., combined with the internal events risk) is not significant.

Further, the safety analysis of internal floods and fires appears to rely substantially on the availability of the normal charging pump and turbine-driven auxiliary feed water pump, and possibly on the normal alignment of normal service water (NSW) to the operating ESW header. Because internal floods and fires are apparently not included in the configuration risk management program, unplanned unavailability of these components would not be quantitatively assessed, and could result in a high risk configuration. This safety issue would need to be addressed through appropriate companion controls for turbine driven auxiliary feedwater pump [TDAFP] and for normal charging pump [NCP] and NSW supply alignment to the operable ESW to assure the availability of these functions during the extended ESW outage. (The licensee has previously committed (in response to RAI) to have the turbine-driven feedwater pump operable, and NSW to ESW alignment available during the proposed extended ESW outage time.)

Finally, the staff requested the licensee to identify uncertainty impacts of critical assumptions supporting its analyses. One specific assumption was a 50-percent reduction in the loss of offsite power (LOOP) frequency during the ESW outage, due to restrictions on switch yard access and favorable weather over the 14-day period based on monitoring the long-range forecasts. The licensee's uncertainty analysis demonstrated that the risk results are sensitive to these assumptions, and therefore, a more rigorous assessment of the LOOP frequency reduction is warranted. In addition, the staff does not believe it to be appropriate to reduce weather-related LOOP frequency based on long-range forecasts.

The staff also notes that the licensee has not updated its risk analyses to account for the new commitments regarding the NSW alignment to ESW, and the availability of backup diesel generators. Given that the risk impact from internal events is already above the Regulatory Guide 1.177 guidance, the staff would have expected revised calculations which show the lower risk impacts.

Response

The supplemental information provided below is grouped into 3 parts. Part I responds to paragraphs 1 and 2 above. Part II responds to paragraph 3 above. Part III responds to paragraphs 4 and 5 above.

Part I

In response to the NRC staff's request, the Callaway internal flooding and external event fire risks were estimated for the configuration that the plant intends to operate in during the extended essential service water (ESW) Completion Time (CT). Enclosure 3 of ULNRC-05500 identified the risk-significant internal flooding and external event fire areas. Those areas were reviewed to determine the risk increase, during the extended ESW CT, for floods and fires.

Flood Risk

The following flooding risk evaluation is generally based on the data and methods used in the Callaway Plant Individual Plant Examination (IPE). The IPE was submitted to the NRC in September of 1992. The NRC Staff Evaluation Report (SER) on the Callaway IPE submittal was issued in May 1996.

The flood frequency, due to a pipe failure in the protected ESW train, was determined for each risk-significant flood area. The determination of which flood areas are risk-significant for this license amendment request was discussed in the response to question 3.b in ULNRC-05500 (all 16 flood areas listed in Enclosure 3 of that letter) and included considerations of initiating event frequency (flood frequency greater than 1E-05/yr) and whether a pipe break in the protected

ESW train is part of the flooding source. The flood frequencies were obtained from the IPE. The IPE states that flood initiator frequencies were estimated using a combination of EPRI NP-6992L, EGG-SSRE-9639, NSAC-60, and EPRI TR-102266. As was done in the IPE, a flood in a given flood area is assumed to fail all PRA-credited equipment in the flood area, as well as fail the flooding source (in this case, the protected ESW train).

Credit was taken for the 1-hour flood watches to be posted per commitment in flood areas A-2, A-4, A-24, A-25, ES-1, ES-2, SIX-A, UHS-1, and UHS-2. The IPE flood analysis applied a factor of 0.3 to the flood frequencies of certain flood areas. This factor was based on EPRI Report TR-102266, which indicated that almost 70% of pipe leaks and ruptures were identified by routine and incidental observations by plant personnel. Given the increased observations afforded by the 1-hour flood watches, a 0.1 factor was applied to the flood frequencies of the above flood areas. This factor accounts for the 1-hour flood watches detecting a leak or rupture, alerting the control room of the leak or rupture, and the control room isolating the ESW leak or rupture. The above actions are governed by Callaway procedure APA-ZZ-00750.

Credit was taken for the normal charging pump (NCP), to provide RCP seal injection, and for the turbine driven auxiliary feedwater pump (TDAFP), to provide decay heat removal, for areas A-2, A-4, A-13, A-14, C-14, D-1, D-2, and TWO. Floods in these areas are either contained due to watertight doors or the floods are in areas in which propagation to the NCP and TDAFP rooms is not possible. Credit was taken for the NCP and the TDAFP, and the normal service water system supplying the protected ESW train's service loads for the entire 14-day LCO outage for areas ES-1, ES-2, UHS-1, and UHS-2. Floods in these areas will not propagate to the NCP or TDAFP rooms, nor will the floods impact the ability of the normal service water system to service the protected ESW train's service loads due to the break location(s). No credit for mitigation was taken for any of the other flood areas listed in Enclosure 3 of ULNRC-05500 (namely, A-22, A-24, A-25, and SIX-A). No credit was taken for the ability of the normal service water system to supply the out-of-service ESW train's loads. This is conservative, since floods in most of the above flood areas will only fail protected train equipment.

The following table provides the risk metrics associated with internal floods for the requested one-time per ESW train completion time extension, based upon the flood areas, flood frequencies, and mitigation credit discussed above. Note that the values in the table reflect the entire 14-day Completion Time per ESW train.

Risk Metric:	Flood Value:
ICCDP:	3.03E-07 per 14-day CT
Delta-CDF:	6.06E-07 per year
ICLERP:	7.27E-09 per 14-day CT
Delta-LERF:	1.45E-08 per year

There are no train differences in ICCDP, ICLERP, delta-CDF, and delta-LERF given in the above table. This occurs for two reasons: 1) the flood frequencies from the IPE are based on conservative, generic pipe section counts that were applied to each train-specific flood area, and 2) no credit was taken for the ability of the normal service water system to supply the out-of-service ESW train's loads and, therefore, the CCDPs are not dependent on the difference in the unavailable times of normal service water between the trains (48 hours for ESW train 'A' and 120 hours for ESW train 'B').

Fire Risk

The following fire risk evaluation is generally based on the data and methods used in the Callaway Plant Individual Plant Examination of External Events (IPEEE). The IPEEE fire analysis used the EPRI Fire Induced Vulnerability Evaluation (FIVE) method. The IPEEE was submitted to the NRC in June of 1995. The NRC SER on the Callaway IPEEE submittal was issued in September 1999.

Each risk-significant fire area was reviewed to determine its fire frequency, any fire suppression capability to be credited, whether it had been fire modeled in detail, and remaining mitigation equipment to be credited. The determination of which fire areas are risk-significant for this license amendment request was discussed in the response to question 3.c in ULNRC-05500 (all 30 fire areas listed in Enclosure 3 of that letter) and included only the consideration of initiating event frequency (fire areas with a fire frequency greater than 1E-03/yr, plus the NCP room). The fire frequencies were obtained from the IPEEE. The fire frequencies used in the IPEEE were based upon the EPRI Fire Events Database (NSAC-178L). As was done in the IPEEE, a fire in a given fire area is assumed to fail all PRA-credited equipment in the fire area, as well as fail equipment associated with cable in the fire area, unless the fire area was fire modeled in detail. The unavailability of fire suppression equipment was obtained from the IPEEE, which referenced the EPRI FIVE document (EPRI TR-100370). The unavailability of pre-action sprinkler systems and Halon systems is 0.05. The unavailability of wet pipe sprinkler systems is 0.02.

Credit for operation of the NCP, to provide RCP seal injection, and the TDAFP, for decay heat removal, was not generally taken as was done for the risk-significant flood areas. The cable routing for the NCP has not been traced in sufficient detail to ensure that the NCP would be

available in most fire areas. The combination of the NCP and TDAFP was credited for fire areas ES-1 and ES-2 since fires in these areas will not impact the NCP or TDAFP.

Of the thirty (30) fire areas identified in Enclosure 3 of ULNRC-05500, two (2) fire areas had been fire modeled in detail in the IPEEE and this modeling resulted in sufficiently low fire frequencies such that no credit for mitigation was taken in this evaluation. Twenty (20) fire areas had the equivalent of approximately one train of mitigation equipment available after accounting for one train of ESW being out-of-service. Credit for the remaining mitigation equipment, and credit for pre-action sprinkler fire suppression systems in fire areas D-1 and D-2, resulted in small increases in risk for these 20 fire areas.

A fire that would occur in any of the remaining eight (8) fire areas would impact the protected engineered safety feature (ESF) train. A fire in fire area A-22 can fail cable for the 'A' train ESW pump. Assuming the 'A' train is the protected train, as will be the case during the LCO outage on the 'B' ESW train, credit was taken for the normal service water system supplying the 'A' train ESW service loads for this fire area. A fire in fire area C-6 can fail cable for the 'B' train ESF pumps (this refers to the 'B' train ESW, component cooling water, motor-driven auxiliary feedwater, emergency core cooling system, and containment spray pumps). Assuming the 'B' train is the protected train, no credit was taken for the normal service water system supplying the 'B' train ESW service loads since the ESF pumps in this train would be unavailable due to the fire.

Instead, credit was taken for the normal service water system supplying the out-of-service ESW train's service loads, in this case the out-of-service 'A' ESW train for all but 48 hours of the 'A' train ESW 14-day LCO outage. In addition, credit was taken for the wet pipe sprinkler fire suppression system in fire area C-6.

A fire in fire areas A-17, A-18, C-9, C-10, C-15, and C-16 can fail the associated train's ESF pumps. Assuming that the room-affiliated train is protected, no credit was taken for the normal service water system supplying that ESW train's service loads since the ESF pumps in the same train would be unavailable due to the fire. Once again, credit was taken for the normal service water system supplying the out-of-service ESW train's service loads for all but 48 hours (ESW train 'A') and 120 hours (ESW train 'B') of the 14-day LCO outage. Credit was taken for the Halon fire suppression systems in fire areas A-17, A-18, C-9, and C-10. In addition, credit was taken for posting a continuous fire watch in fire areas A-17, A-18, C-9, C-10, C-15, and C-16. The IPEEE fire analysis applied a factor of 0.1 to the fire frequencies of certain fire areas. This factor accounts for the Fire Brigade failing to manually suppress a fire. The factor was applied in the IPEEE to those fire areas in which the Fire Brigade can be alerted, and respond, to a fire prior to cable damage. Given the increased observations and local manual fire fighting capability afforded by the continuous fire watch commitment, the 0.1 factor was applied to the fire frequencies of the above fire areas in this evaluation. This factor accounts for the continuous fire watches detecting a fire, alerting the control room (and thereby the Fire Brigade) of the fire,

and initiating local manual fire fighting. The above actions are governed by Callaway procedure SDP-KC-00001.

The following table provides the risk metrics associated with external fires for the requested one-time per ESW train completion time extension, based upon the fire areas, fire frequencies, and mitigation credit discussed above. Note that the values in the table reflect the entire 14-day Completion Time per ESW train.

Risk Metric:	Fire Value:
ICCDP:	1.93E-06 per 14-day A-train CT 4.87E-06 per 14-day B-train CT
Delta-CDF:	6.80E-06 per year
ICLERP:	4.63E-08 per 14-day A-train CT 1.17E-07 per 14-day B-train CT
Delta-LERF:	1.63E-07 per year

The train differences in ICCDP, ICLERP, delta-CDF, and delta-LERF, given in the above table are due to two factors: 1) the fire frequencies from the IPEEE are different between train-specific fire areas because of differing numbers of fire sources (transformers, electrical cabinets, etc.) in the train-specific fire areas, and 2) the CCDP contribution of the normal service water system to the out-of-service ESW train is different because of the difference in the unavailable times of normal service water between the trains (48 hours for ESW train 'A' and 120 hours for ESW train 'B').

Flood and Fire Risk Sensitivities

In a public meeting with the NRC staff on July 1, 2008, representatives from the Division of Risk Assessment requested that AmerenUE provide a discussion regarding the sensitivity of the flooding and fire risk evaluations to the credited 1-hour flood watches and continuous fire watches.

If the factor for the failure of the 1-hour flood watches to detect a leak or rupture is doubled (i.e., factor of 0.2), the delta-CDF and delta-LERF, due to floods, increase by 26%. This is a relatively small risk increase.

If the factor for the failure of the continuous fire watches to detect and fight a fire is doubled (i.e., factor of 0.2), the delta-CDF and delta-LERF, due to fires, increase by 71%. However, note that when detailed fire modeling was performed in the Callaway IPEEE, the CDFs for the detailed fire modeled fire areas were typically reduced by 2-to-6 orders of magnitude as compared to the CDFs generated when all PRA-credited equipment and cable was assumed to fail in the fire areas. It is expected that detailed fire modeling of the fire areas important to this evaluation would result in at least an order of magnitude reduction in the delta-CDF and delta-

LERF due to fires.

Part II

The Tier 2 commitments listed in Enclosure 4 to ULNRC-05500 provide controls relative to the operability of the turbine-driven auxiliary feedwater pump (TDAFP) and the functionality of the normal charging pump (NCP) and corresponding room access restrictions.

Attachment 2 of this submittal contains changes to the Tier 2 commitment list with respect to definitive actions to be taken if an emergent condition were to render either the TDAFP inoperable or the NCP non-functional during the 14-day LCO outage per ESW train.

The proposed MODE 4 end state for the NCP, though not required by the Callaway TS, is consistent with the conclusions presented in WCAP-16294, "Risk-Informed Evaluation of Changes to Technical Specification Required Action Endstates for Westinghouse NSSS PWRs," for LCOs 3.5.3 (ECCS Shutdown) and 3.5.4 (RWST). Although NRC has not yet finished its review of WCAP-16294, there have been no indications that a MODE 4 end state would not be accepted for those ECCS-related LCOs.

Part III

The baseline Callaway LOOP frequency, used in the internal events PRA, is 1.78E-2 yr^{-1}. This value was determined by reviewing industry LOOP events, as documented in an EPRI database (1002987), screening out those events that could not occur at Callaway (e.g., LOOP events caused by salt-coated switchyard insulators due to ocean spray), using the remaining events to develop a generic LOOP frequency applicable to Callaway Plant, and performing a Bayesian update of this generic frequency with Callaway-specific experience.

The risk metrics reported to the NRC thus far in the amendment process for this ESW Completion Time extension request have credited a 50-percent reduction in both the switchyard and weather contributions to LOOP frequency, in order to credit the associated compensatory measures. This 50-percent LOOP frequency reduction was based on a general knowledge of the events in the EPRI database, and has been used in previous Callaway PRA applications.

In order to perform a more rigorous assessment of the credited LOOP frequency reduction, due to switchyard-related compensatory measures committed to in this license amendment request, the EPRI LOOP event database, used in the calculation of the baseline Callaway LOOP frequency, was reviewed. Specifically, those industry LOOP events, documented in the database, which were previously deemed in existing Callaway LOOP frequency analyses to be switchyard-related, were assessed to determine if a similar event could occur at Callaway during

the extended ESW CT, given the switchyard-related compensatory measures and other considerations. Of the 22 switchyard-related events in the EPRI database, 11 were caused, at least in part, by human errors or other events that would not be expected to occur during the extended ESW CT, given the switchyard-related commitments and other considerations. Given that half of the switchyard-related LOOP events in the EPRI database would not be expected to occur during the extended ESW Completion Time, a 50-percent reduction in the switchyard contribution to LOOP frequency is appropriate. The resulting LOOP frequency, with no credit taken for the long-range weather forecasts, is 1.22E-2 yr^{-1}.

The staff noted in Enclosure 5 that commitments related to NSW alignment to ESW and the availability of backup diesel-generators were not credited in the risk analyses. Accordingly, AmerenUE has recalculated the risk metrics associated with this license amendment request, taking credit for the backup diesel-generators, cooling of the out-of-service ESW train loads with normal service water, and the LOOP frequency reduction associated with the switchyard-related compensatory measures. The revised internal events risk metrics are provided in the table below. The values in the table do not reflect any credit for favorable long-range weather forecasts.

Risk Metric:	ICCDP / ICLERP:	ΔCDF / ΔLERF (yr^{-1})
Core Damage	1.36E-06 ('B' ESW train out-of-service) 6.83E-07 ('A' ESW train out-of-service)	2.04 E-06
Large Early Release	3.47E-08 ('B' ESW train out-of-service) 1.25E-08 ('A' ESW train out-of-service)	4.72E-08

Note that the risk metric values provided in the above table are based on cooling the 'A' ESW train loads with normal service water for 288 hours of the 14-day Completion Time during the 'A' train LCO outage, and cooling the 'B' ESW train loads with normal service water for 216 hours of the 14-day Completion Time during the 'B' train LCO outage.

In a public meeting with the NRC staff on July 1, 2008, representatives from the Division of Risk Assessment requested that AmerenUE provide a discussion regarding the alternative of performing the ESW piping modification with the plant shut down. As discussed in the response to Question 1 of Enclosure 3, performing the ESW piping connection during a one-time 14-day LCO outage with the reactor online would be a more controlled evolution since the plant management and work force resources will be prioritized to focus on this modification. This

would lead to enhanced attention to detail, better and more effective work controls, and, consequently, a more efficient and safe work situation. In addition, if this work were to be performed during an outage, it could be commenced in MODE 5 with the RCS loops filled. In this configuration, only one train of RHR is required to be operable and operating (with either the second RHR train operable or two steam generators with sufficient inventory per LCO 3.4.7). There would be no requirement for non-safety-related normal service water to be available to cool either the operable or inoperable train of equipment. The operating train of RHR, and associated support equipment, would be subject to fires, floods and random equipment failure. Should failure of the operating train of RHR occur, long-term decay heat removal could be lost, with the attendant risk of RCS boiling and core uncovery. Given the ability to better focus on this modification with the plant online, and the numerous compensatory measures that have been committed to in order to reduce the risk associated with performance of the modification during the extended ESW Completion Time, AmerenUE believes that performance of the ESW piping modification with the plant online is the better alternative.

In the public meeting of July 1, 2008, the NRC staff also suggested that AmerenUE consider identifying additional compensatory measures that could be taken during the extended ESW Completion Times. AmerenUE has considered the staff's suggestion, and concluded that an effective, additional compensatory measure that can be taken would be to train operations personnel on the dominant internal events, fire and internal flooding core damage scenarios, associated with the plant configuration during the extended ESW Completion Time, including discussion of mitigation strategies for these scenarios. Accordingly, the Summary of Regulatory Commitments in Attachment 2 has been revised to add this compensatory measure to the operator training commitment.

Conclusion:

With the new risk information provided above, the cumulative effects on CDF and LERF for internal events, floods, and fires are such that this amendment falls within Region II of Regulatory Guide 1.174, Figures 3 and 4, for delta-CDF and delta-LERF.

Consideration is requested to be given to the fact that this is a one-time only change for the purposes of addressing an important system's health issues, and extensive commitments are being made in Attachment 2.

ATTACHMENT 2

SUMMARY OF REGULATORY COMMITMENTS

SUMMARY OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by AmerenUE in this document. Any other statements in this submittal are provided for information purposes and are not considered to be commitments. Please direct questions regarding these commitments to Mr. Scott Maglio, Assistant Manager – Regulatory Affairs, (573) 676-8719.

COMMITMENT	Due Date/Event
1. The proposed changes to the Callaway Technical Specifications will be implemented prior to December 3, 2008.	Prior to December 3, 2008.
2. For no more than 48 hours during the 'A' ESW train LCO outage, and no more than 120 hours during the 'B' ESW train LCO outage, normal service water will not be available to the out-of-service ESW train. During these time limits, no PRA-modeled equipment, other than the out-of-service ESW train and supported systems rendered inoperable by that ESW train being out-of-service, will be voluntarily taken out-of-service during the one-time extended Completion Time taken on each train. This applies only to PRA-modeled equipment in the protected ESF train (ESF train not served by the inoperable ESW train) during these time limits that normal service water is unavailable. No work will be allowed on the protected (operable) ESW train. The preceding was credited in the risk metric calculations supporting this license amendment request. No work will be allowed in the area of equipment in the protected ESF train (within 20 feet unless there is an intervening barrier) except for yard piping work and work in control building room 3101 where the underground piping enters the control building.	Administrative controls in place at time amendment is implemented. This is a Tier 2 commitment. See footnote 1.
3. For the rest of the 'A' ESW train and 'B' ESW train LCO outages (the one-time 14-day Completion Times per ESW train minus the time limits noted above), the out-of-service ESW train loads will be cooled by normal service water. Credit has been taken in the risk metric calculations for the ESF equipment serviced by the protected ESW train for the entire 14-day LCO outage on the opposite train (and for normal service water supplying the protected train loads if the protected ESW pump were to fail) and for the ESF equipment that can be serviced by normal service water associated with the out-of-service ESW train for the times note above. None of the PRA-modeled equipment in either train will be voluntarily taken out of service during the time that normal service water is available to supply the out-of-service ESW train loads. This commitment applies as long as the one-time 14-day Completion Time extension of TS 3.7.8 Condition A and TS 3.8.1 Condition B is in use; this commitment expires when these TS Conditions are exited.	

4. Access to the switchyard will be limited to personnel with a demonstrable need (operator rounds involving no equipment manipulation and staff associated with performing the 8-hour readiness checks on the temporary DGs) and no pre-planned work or testing or preventive maintenance will be allowed in the switchyard, or other areas of the plant, that could cause a loss of offsite power (LOOP) event during the one-time 14-day extended Completion Time. Credit was taken for this commitment in the risk metric calculations supporting this license amendment request. The only other access to the switchyard that would be considered would be for corrective maintenance that would address an emergent condition before it led to a LOOP event.	Administrative controls in place at time amendment is implemented. This is a Tier 2 commitment. See footnote 2.
5. The one-time 14-day extended Completion Time will not be entered if, prior to entry, inclement weather conditions are forecasted, i.e., work under the extended Completion Time will not be started if Severe Weather as defined in OTO-ZZ-00012 is forecasted to occur within 140 miles of the plant. National Weather Service reports will be monitored prior to and throughout each ESW train LCO outage.	Administrative controls in place at time amendment is implemented. This is a Tier 2 commitment. See footnote 3.
6. From EDP-ZZ-01129 Appendix 2 for a DG or ESW outage and TS 3.7.5, the following Tier 2 commitments are also added to the scope of this amendment request: • The turbine-driven auxiliary feedwater pump (TDAFP) will remain Operable. If the TDAFP were to become inoperable during the 14-day LCO outage, TS 3.7.5 Condition D would require a plant shutdown to MODE 3 within 6 hours and to MODE 4 within 12 hours since one MDAFW train is already inoperable at the beginning of the LCO outage. • The TDAFP pump room and associated valve rooms will be posted as restricted access. • The protected train motor-driven auxiliary feedwater pump (MDAFP) pump room and associated valve rooms will be posted as restricted access. • The condensate storage tank (CST) will be posted as restricted access. • No work will be allowed on the Security Diesel.	Administrative controls in place at time amendment is implemented. This is a Tier 2 commitment. See footnote 4.

7. For the time limits (14 days minus 48 hours on ESW train 'A' and 14 days minus 120 hours on ESW train 'B') noted above in commitment 3, the piping tie-in (new underground PE ESW piping to the rest of the system) will be performed with the normal service water system cooling the out-of-service ESW train heat loads. During the portion of the extended Completion Time that normal service water is supplying the ESW loads, the normal service water to ESW supply and return cross-connect valves will be opened and power removed from the operators. Credit was taken for the preceding in the risk metric calculations supporting this license amendment request. The ESW return to UHS valves will be closed and power removed from the operators during this portion of the extended 14-day Completion Time as well.	Administrative controls in place at time amendment is implemented. This is a Tier 2 commitment. See footnote 5.
8. Prior to entering the extended 14-day ESW Completion Times, the Operations department will verify the availability of fire protection equipment per Callaway procedure APA-ZZ-00703 (operability requirements spelled out in FSAR Section 9.5.1.7 and Table 9.5.1-2 will apply throughout the 14-day LCO outage subject to the Applicable Modes column of Table 9.5.1-2) and flood mitigation (drains, watertight doors) equipment to assure that important plant design features, for mitigation of fires or floods that could impact the protected train, are available. In addition, prior to entering the extended ESW CTs, a walkdown of the above ground portion of the protected ESW train will be performed for transient combustibles, except for the portion of the protected train inside containment or otherwise excluded by the Radiation Protection department. Removal of any transient combustibles, pursuant to this walkdown, was credited in the fire risk quantification performed to support this license amendment request. This walkdown will also address the seismic interaction commitments made in response to RAI 3.(a) in ULNRC-05500. The 14-day LCO outage on each ESW train will not proceed until all transient combustibles that could affect the protected ESW train and the ESF equipment it serves are removed, watertight doors protecting ESF equipment associated with the protected ESW train are verified to be closed and functional, drains in rooms serving ESF equipment associated with the protected ESW train are verified to be unobstructed, and fire detection and suppression equipment in fire areas associated with the protected ESW train are verified to be available.	Administrative controls in place at time amendment is implemented. This is a Tier 2 commitment. See footnote 6.

9. Continuous, one-hour, and eight-hour fire and flood watches will be instituted on the protected ESW train as discussed in the response to RAI s 3.b and 3.c in ULNRC-05500 and footnote 6 below. The NCP will remain functional and its room will be posted as restricted access. The preceding commitments were credited in the fire and flooding risk metric quantifications performed to support this license amendment request. If the NCP were to become non-functional during the 14-day LCO outage such that the pump becomes unable to provide the required RCP seal cooling, administrative controls will require a plant shutdown to MODE 3 within 6 hours and to MODE 4 within 12 hours.	Administrative controls in place at time amendment is implemented. This is a Tier 2 commitment. See footnote 6.
10. Appropriate training will be provided to operations personnel on this TS change and the associated ESW modification, as well as the compensatory measures to be implemented during the one-time extended Completion Time. This training will identify the dominant internal events, fire and internal flooding core damage scenarios, associated with the plant configuration during the extended ESW Completion Time, and include a discussion of mitigation strategies for these scenarios.	Administrative controls in place at time amendment is implemented. This is a Tier 2 commitment. See footnote 7.
11. A temporary alternate power source consisting of diesel generators, with combined capacity equal to or greater than the capacity of either one of the installed emergency DGs, will be available as a backup power source. This temporary alternate AC source could power protected train loads in the unlikely event a loss of offsite power event occurred and the protected train's DG failed to start and run. Prior to entering the extended 14-day CT on each ESW train, these temporary diesel generators will be load tested to provide a load equal to the continuous rating of the inoperable DG. After entering the extended ESW CT on each train, this source will be verified available every 8 hours and treated as protected equipment. This temporary alternate power source is credited in the internal events risk metric calculations performed to support this license amendment request.	Equipment and administrative controls in place at time amendment is implemented. This is a Tier 2 commitment. See footnote 8.

1. This commitment was originally discussed in ULNRC-05445 Attachment 1 (pages 13-14), then revised in the responses to RAI #4 and RAI #6.a in ULNRC-05476.

2. This commitment was originally discussed in ULNRC-05445 Attachment 1 (pages 13-14). LOOP frequency adjustments were discussed in the response to RAI #6.b in ULNRC-05476. Temporary DGs as an alternate AC power source are discussed in the response to RAI #2.b in Enclosure 1 of ULNRC-05482.

3. This commitment was originally discussed in ULNRC-05445 Attachment 1 (pages 13-14). Severe Weather was defined in the response to RAI #6.d in ULNRC-05476.

4. This commitment was originally discussed in the response to RAI #4 in ULNRC-05476.

5. This commitment was originally discussed in ULNRC-05445 Attachment 1 (pages 6, 7, 13-14), then revised in the response to RAI #7.a in ULNRC-05476. When the 'A' ESW train is out-of-service (OOS), valves EFHV0023, EFHV0025, EFHV0039, and EFHV0041 will be opened and power removed from the valve operators. EFHV0037 (return to UHS) will be closed and power removed from the valve operator. When the 'B' ESW train is OOS, valves EFHV0024, EFHV0026, EFHV0040, and EFHV0042 will be opened and power removed from the valve operators. EFHV0038 (return to UHS) will be closed and power removed from the valve operator.

6. This commitment was originally discussed in the response to RAI #4 in ULNRC-05476. Additional clarification was provided in that RAI response with respect to fire and flood watches and walkdowns for transient combustibles to be performed prior to using the extended CT. This commitment was later revised by the responses to RAIs 3.(a), 3.(b), and 3.(c) in Enclosure 1 of ULNRC-5500. The pre-use walkdown will also assure there are no obvious mounting or seismic interaction issues (e.g., loose parts, missing hardware, etc.) for the following equipment: ultimate heat sink (UHS) cooling tower fans and motor control centers, ESW self-cleaning strainers, diesel generator (D/G) intake air filters, and D/G intercooler heat exchangers.

Control building room 3101 was moved from the 1-hour fire and flood watch list to the 8-hour fire and flood watch commitment for the rest of the protected ESW train.

Continuous fire watches will be posted in auxiliary building rooms 1409 and 1410, and in control building rooms 3301, 3302, 3403 through 3405, 3407 through 3411, 3413, and 3414 when equipment in these locations is in the protected ESW train.

The following rooms and buildings will be subject to the 1-hour fire and flood watches when equipment in these locations is in the protected ESW train:

- Auxiliary building rooms 1101 through 1117, 1120 through 1125, 1128-1130, 1201, 1202, 1205, 1322, 1323, 1331, 1401, 1402, 1406, 1407, and 1408
- Diesel generator building rooms 5201 and 5203
- ESW pumphouse rooms U104 and U105
- UHS cooling tower rooms U301, U302, U304, U305, U306, and U307

All other portions of the protected ESW train will be subject to 8-hour fire and flood watches.

7. This commitment was originally discussed in ULNRC-05445 Attachment 1 (page 13).

8. Temporary DGs as an alternate AC power source are discussed in the response to RAI #2.b in Enclosure 1 of ULNRC-05482.

ATTACHMENT 3

MARKUP OF TECHNICAL SPECIFICATIONS

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One DG inoperable. (continued)		Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
	AND		
	B.3.1	Determine OPERABLE DG is not inoperable due to common cause failure.	24 hours
	OR		
	B.3.2	---------- NOTE ---------- The required ACTION of B.3.2 is satisfied by the automatic start and sequence loading of the diesel generator. ----------	
		Perform SR 3.8.1.2 for OPERABLE DG.	24 hours
	AND		NOTE INSERT 1A
	B.4	Restore DG to OPERABLE status.	72 hours AND 6 days from discovery of failure to meet LCO

(continued)

Insert 1A

A one-time Completion Time of 14 days per DG is allowed to support planned replacement of ESW piping prior to December 31, 2008.

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Two offsite circuits inoperable.	C.1	---------- NOTE ---------- In Modes 1, 2, and 3, the turbine driven auxiliary feedwater pump is considered a required redundant feature. ----------	
		Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.	12 hours from discovery of Condition C concurrent with inoperability of redundant required features
	AND		
	C.2	Restore one offsite circuit to OPERABLE status.	24 hours
D. One offsite circuit inoperable. AND One DG inoperable.	---------- NOTE ---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating," when Condition D is entered with no AC power source to any train. ----------		
	D.1	Restore offsite circuit to OPERABLE status.	12 hours
	OR		
	D.2	Restore DG to OPERABLE status.	12 hours

(continued)

No change

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. Two DGs inoperable.	E.1	Restore one DG to OPERABLE status.	2 hours
F. One required LSELS inoperable.	F.1	Declare the affected DG and offsite circuit inoperable.	Immediately
	AND		
	F.2	Restore required LSELS to OPERABLE status.	12 hours
G. Required Action and associated Completion Time of Condition A, B, C, D, E, or F not met.	G.1	Be in MODE 3.	6 hours
	AND		
	G.2	Be in MODE 5.	36 hours
H. Three or more AC sources inoperable.	H.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	7 days
SR 3.8.1.2	---------- NOTES ---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. ---------- Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3740 V and ≤ 4320 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	31 days

(continued)

ATTACHMENT 4

RETYPED TECHNICAL SPECIFICATIONS

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One DG inoperable. (continued)		Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
	AND		
	B.3.1	Determine OPERABLE DG is not inoperable due to common cause failure.	24 hours
	OR		
	B.3.2	---------- NOTE ---------- The required ACTION of B.3.2 is satisfied by the automatic start and sequence loading of the diesel generator. ----------	
		Perform SR 3.8.1.2 for OPERABLE DG.	24 hours
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One DG inoperable. (continued)	B.4 Restore DG to OPERABLE status.	---------NOTE--------- A one-time Completion Time of 14 days per DG is allowed to support planned replacement of ESW piping prior to December 31, 2008. ---------- 72 hours AND 6 days from discovery of failure to meet LCO
C. Two offsite circuits inoperable.	C.1 ---------- NOTE ---------- In Modes 1, 2, and 3, the turbine driven auxiliary feedwater pump is considered a required redundant feature. ---------- Declare required feature(s) inoperable when its redundant required feature(s) is inoperable. AND	12 hours from discovery of Condition C concurrent with inoperability of redundant required features

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Two offsite circuits inoperable. (continued)	C.2	Restore one offsite circuit to OPERABLE status.	24 hours
D. One offsite circuit inoperable. AND One DG inoperable.	---------- NOTE ---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating," when Condition D is entered with no AC power source to any train. ----------		
	D.1	Restore offsite circuit to OPERABLE status.	12 hours
	OR		
	D.2	Restore DG to OPERABLE status.	12 hours
E. Two DGs inoperable.	E.1	Restore one DG to OPERABLE status.	2 hours
F. One required LSELS inoperable.	F.1	Declare the affected DG and offsite circuit inoperable.	Immediately
	AND		
	F.2	Restore required LSELS to OPERABLE status.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. Required Action and associated Completion Time of Condition A, B, C, D, E, or F not met.	G.1	Be in MODE 3.	6 hours
	AND		
	G.2	Be in MODE 5.	36 hours
H. Three or more AC sources inoperable.	H.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	7 days
SR 3.8.1.2	---------- NOTES ---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. ---------- Verify each DG starts from standby conditions and achieves steady state voltage $\geq$ 3740 V and $\leq$ 4320 V, and frequency $\geq$ 58.8 Hz and $\leq$ 61.2 Hz.	31 days

(continued)

ATTACHMENT 5

PROPOSED TECHNICAL SPECIFICATION BASES CHANGES
(for information only)

BASES

ACTIONS

B.3.1 and B.3.2 (continued)

preplanned preventive maintenance, testing, or maintenance to correct a condition which, if left uncorrected, would not affect the OPERABILITY of the DG, or for an inoperable Support System, or for an independently testable component, SR 3.8.1.2 does not have to be performed. If the cause of inoperability exists on the other DG, the other DG would be declared inoperable upon discovery and Condition E of LCO 3.8.1 would be entered. Once the failure is repaired, the common cause failure no longer exists, and Required Action B.3.1 is satisfied. If the cause of the initial inoperable DG cannot be confirmed not to exist on the remaining DG, performance of SR 3.8.1.2 suffices to provide assurance of continued OPERABILITY of that DG. Required Action B.3.2 is modified by a Note stating that it is satisfied by the automatic start and sequence loading of the DG.

In the event the inoperable DG is restored to OPERABLE status prior to completing either B.3.1 or B.3.2, the plant corrective action program will continue to evaluate the common cause possibility. This continued

evaluation, however, is no longer under the 24 hour constraint imposed while in Condition B.

According to Generic Letter 84-15 (Ref. 7), 24 hours is reasonable to confirm that the OPERABLE DG(s) is not affected by the same problem as the inoperable DG.

INSERT B2 (separate paragraph) →

B.4

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition B for a period that should not exceed 72 hours.

In Condition B, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action B.4 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of

failing to meet the LCO. If Condition B is entered while, for instance, an offsite circuit is inoperable and that circuit is subsequently restored OPERABLE, the LCO may already have been not met for up to 72 hours.

(continued)

INSERT B2

Both Completion Times of Required Action B.4 are modified by a Note that allows a one-time Completion Time of 14 days per DG to support the planned replacement of ESW piping prior to December 31, 2008.

ACTIONS

B.4 (continued)

This could lead to a total of 144 hours, since initial failure to meet the LCO, to restore the DG. At this time, an offsite circuit could again become inoperable, the DG restored OPERABLE, and an additional 72 hours (for a total of 9 days) allowed prior to complete restoration of the LCO. The 6 day Completion Time provides a limit on time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between the 72 hour and

6 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

As in Required Action B.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition B was entered.

C.1 and C.2

Required Action C.1, which applies when two offsite circuits are inoperable, is intended to provide assurance that an event with a coincident single failure will not result in a complete loss of redundant required safety functions. The Completion Time for this failure of redundant required features is reduced to 12 hours from that allowed for one train without offsite power (Required Action A.2). The rationale for the reduction to 12 hours is that Regulatory Guide 1.93 (Ref. 6) allows a Completion Time of 24 hours for two required offsite circuits inoperable, based upon the assumption that two complete safety trains are OPERABLE. When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter Completion Time of 12 hours is appropriate. These features are powered from redundant AC safety trains. This includes motor driven auxiliary feedwater pumps and the turbine driven auxiliary feedwater pump which must be available for mitigation of a feedwater line break. Single train features, other than the turbine driven auxiliary feedwater pump, are not included in this Condition.

A Note is added to this Required Action stating that in MODES 1, 2, and 3, the turbine driven auxiliary feedwater pump is considered a required redundant feature. The reason for the Note is to confirm the

OPERABILITY of the turbine driven auxiliary feedwater pump in this Condition, since the auxiliary feedwater pump is not by itself capable of

(continued)