

January 30, 2004

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

Ladies and Gentlemen:

ULNRC-04911



**DOCKET NO. 50-483  
UNION ELECTRIC COMPANY  
CALLAWAY PLANT  
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION  
REGARDING LICENSE AMENDMENT REQUEST OL-1225  
(REVISION TO TECHNICAL SPECIFICATIONS FOR EXTENSION OF  
REQUIRED ACTION COMPLETION TIME FOR DIESEL GENERATORS)**

- 1) AmerenUE Letter ULNRC-04866, "License Amendment Request OL-1225 – Revision to Technical Specifications for Extension of Required Action Completion Time for Diesel Generators," from R. Affolter (AmerenUE) to USNRC, dated June 27, 2003.
- 2) AmerenUE Letter ULNRC-04917, "Revision of License Amendment Request OL-1225 Regarding Proposed Changes to Technical Specifications for Extension of Required Action Completion Time for Diesel Generators," from K. Young (AmerenUE) to USNRC, dated December 19, 2003.

By application for amendment (OL-1225) of the Facility Operating License (No. NPF-30) for the Callaway Plant (per References 1 and 2 above), Union Electric Company (AmerenUE) requested changes to Technical Specification (TS) 3.8.1, "AC Sources – Operating." The changes would provisionally permit a longer Required Action Completion Time [allowed outage time (AOT)] for an inoperable emergency diesel generator when the diesel generator is voluntarily removed from service to undergo planned on-line maintenance.

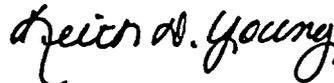
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AmerenUE's license amendment request (LAR) is currently under review by the NRC staff. From that review the staff has identified the need for additional information in order to complete its review of the LAR. As a result, requests for additional information (RAIs) were electronically transmitted to AmerenUE on October 3 and 20, 2003.

This letter provides, via Attachment 1, responses to all of the NRC staff's questions / requests for information received via the RAIs of October 3 and 20. The attached responses support the TS changes as proposed in the amendment application (References 1 and 2, combined) and therefore do not constitute changes to what is proposed and do not require any changes to the evaluations contained in the application, including the Basis for No Significant Hazards Evaluation. Also attached is a "List of Commitments" document (i.e., Attachment 2) wherein a commitment made in connection with one of the RAI responses in Attachment 1 is identified.

Please contact us for any additional questions you may have regarding the attached responses or AmerenUE's amendment application.

Very truly yours,



Keith D. Young  
Manager, Regulatory Affairs

TBE/mlc

- Attachment: 1) Responses to Requests for Additional Information Regarding Proposed Changes to Technical Specifications to Permit a Longer Diesel Generator Allowed Outage Time  
2) List of Commitments

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STATE OF MISSOURI     )  
  )  
COUNTY OF CALLAWAY )

SS

Keith D. Young, of lawful age, being first duly sworn upon oath says that he is Manager, Regulatory Affairs, for Union Electric Company; that he has read the foregoing document and knows the content thereof; that he has executed the same for and on behalf of said company with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By Keith D. Young  
Keith D. Young  
Manager, Regulatory Affairs

SUBSCRIBED and sworn to before me this 30<sup>th</sup> day of January, 2004.



Cathy J. Crisp  
Notary Public  
State of Missouri  
Expiration 1-29-06

**Responses to Requests for Additional Information  
Regarding Proposed Changes to Technical Specifications to  
Permit a Longer Diesel Generator Allowed Outage Time**

The following are AmerenUE's responses to requests for information (RAIs) received from the NRC staff regarding proposed changes to Technical Specification (TS) 3.8.1, "AC Sources - Operating," for Callaway. The proposed changes were submitted to the NRC via an amendment application (AmerenUE letter ULNRC-04866) dated June 27, 2003, as supplemented/revised by AmerenUE letter ULNRC-04917 dated December 19, 2003. The TS changes would extend the Required Action Completion Time [i.e., allowed outage time (AOT)] for an inoperable diesel generator when the diesel generator is removed from service to undergo preplanned maintenance during plant operation.

The RAIs addressed below were identified during the staff's ongoing review of AmerenUE's amendment application. Question/request Nos. 1 through 5 (including all four parts of No. 5) were electronically transmitted to AmerenUE on October 3, 2003. The last question/request (No. 6) was electronically transmitted on October 20, 2003

\* \* \* \* \*

1. *It is stated that on-line preventative maintenance activities will be performed on the DGs during the 108-hour extended AOT. Because it is not clear from the application what maintenance activities are planned to be performed during the 108-hour extended DG AOT, discuss what maintenance activities are planned for the extended AOT. For each maintenance activity define the retest requirements that would be utilized to restore DG operability and the justification as to why the retest requirements are sufficient to demonstrate operability. Explain why the 30-day start and load test, the partial system operational tests, and system analysis demonstrate compliance with the testability requirements of GDC 17 and GDC 18, and describe the trending analysis acceptance criteria that will be used to determine operability.*

**Response:**

Callaway's management policy and procedural guidance for work planning and control dictates that intentional entry into the TS Action statement of a Limiting Condition for Operation (LCO) for planned maintenance and related work activities should be based on utilizing not more than one half of the allowed outage time (AOT or Completion Time) specified in the Technical Specification(s) for the inoperable system, structure or component. This provides margin to accommodate any unexpected difficulty, delays or conditions encountered during performance of the preventive maintenance activity, despite careful planning (including previous experience applied to such planning). For the proposed 108-hour (4-1/2 day) "extended" DG AOT, this time limit would be 54 hours. However, based on experience to date, approximately 18 hours is typically needed for tagging and DG heatup and testing during a DG outage. Thus, the 108-hour AOT/Completion Time would support approximately 36 hours of actual on-line work time.

There are many kinds of maintenance activities that could be done during the 36-hour period, including inspections or checks of such things as the air-start distributors, main air-start valves, camshafts, gear train, generator windings, crankcase (without draining oil), check and set valve lash, air-start check valves, bearing clearances, web deflection, air-start filters, and turbo water passages. Another possible activity would be lube oil filter replacement. However, it would not be possible to complete more extensive inspection/teardown activities or highly intrusive preventive maintenance during such a timeframe, so it is expected that those kinds of activities will continue to be performed during plant refueling outages. Those activities include, for example, removal of all exhaust valves for cleaning and O-ring replacement (an activity that is performed approximately every 4-1/2 years) and replacement of cylinder liner O-rings (which is done approximately every 12 years).

For the kinds of activities that will likely be performed under the 108-hour Completion Time, it is anticipated that the start and load (1-hour) test will, at most, be the post-maintenance test normally specified for restoring/confirming operability of the affected DG. The basis for this test is further discussed in the response to Question 4.

2. *As a station blackout (SBO) commitment, the licensee is to maintain a DG target reliability of 0.95. An unavailability of less than or equal to 150 hours for each train per operating cycle and incurring less than or equal to two maintenance preventable functional failures are the performance criteria for the DGs. Discuss (1) the reliability and unavailability of the DGs in the last three operating cycles and (2) the impact of the AOT extension on DG unavailability in accordance with 10 CFR 50.65 (i.e. The Maintenance Rule).*

**Response:**

- (1) Unavailability and unreliability information for the two DGs at Callaway (i.e., NE01 and NE02) is summarized in Table 1 below.

|          | Unavailability |           | Unreliability  |   |
|----------|----------------|-----------|--|---|
|          | NE01           | NE02      | NE01   | NE02.   |
| Cycle 10 | 75.6 hrs       | 126.6 hrs | Functional Failure documented on 10/7/98.                      | Maintenance Preventable Failure documented on 10/20/99.             |
| Cycle 11 | 113.0 hrs.     | 53.1 hrs. | Functional Failures documented on 8/29/2000 and on 12/20/2000. |   |
| Cycle 12 | 136.5 hrs      | 116.0 hrs |  | Maintenance Preventable Functional Failure documented on 6/21/2001. |

Table 1

- (2) The current Maintenance Rule availability performance criterion for the DGs is an unavailability of no more than 150 hours per train-cycle. The Completion Time extension per OL-1225 is limited to 4.5 days (i.e., 108 hours) per train-cycle. For purposes of the Maintenance Rule, it can be assumed that, initially, each DG would be unavailable for an additional 108 hours during the cycle for on-line, preventive maintenance/testing. Therefore, initially, a revised Maintenance Rule availability performance criterion of no more than 258 unavailable hours per train-cycle can be used. Maintenance Rule performance criteria are updated periodically, however, based upon historical information and other factors. Should the actual increase in DG unavailability be less than the full 108 hours per train-cycle, the initial availability performance criterion discussed above would be changed to more closely match historical performance.
3. *In Attachment 6 to the application, the licensee committed to removing the DGs to perform on-line maintenance with the following restrictions: (1) offsite power supply and switchyard conditions are to be conducive to an extended DG AOT and (2) no equipment or systems assumed to be available in the probabilistic risk analysis for supporting the extended DG AOT are removed from service. In addition, the licensee stated in the application that Callaway will enter into on-line DG maintenance under low-risk times or periods with regards to weather conditions. Discuss what, if any, contingency plans exist or will be developed for the extended DG AOT for unanticipated adverse weather or degraded grid conditions occurring which can significantly increase the probability of losing offsite electrical power.*

**Response:**

Callaway's administrative procedure for compliance with 10CFR50.65(a)(4) requires that the Control Room Supervisor, or his designee, perform a risk assessment at least once per 12-hour shift. This risk assessment must take into account severe weather, as well as any offsite feeds into the switchyard being out of service. If the risk level determined by the risk assessment is sufficiently high so as to require that a contingency plan be put into place, this plan may include an action for returning the inoperable EDG to service, if warranted and feasible.

4. *In attachment 1 of the application the licensee stated that at Callaway there have been no losses of offsite power. Discuss whether this considers the partial (one required source is lost) or complete loss of off site power. The discussion should include the duration, cause(s), date, and time of each loss-of-offsite power (partial or complete) event if any.*

**Response:**

Callaway has never experienced a complete loss of off-site power. A sustained degraded grid voltage condition occurred in 1999, but corrective actions and modifications completed in

response to that event have prevented recurrence to date and greatly reduced the potential for degraded voltages at the plant bus level.

With regard to partial losses of off-site power, such events have been, for the most part, short-term inadvertent isolations of an off-site circuit connection due to events or occurrences on the plant side of the switchyard. A list of these occurrences, including a brief summary of each occurrence, is provided in Table 2 below.

For most occurrences, the event involved a loss of one of the two safety buses during plant outage conditions such that the bus was inadvertently isolated from its off-site circuit connection on a short-term basis. (Note: The Technical Specifications typically only require one train of ESF equipment to be operable during such conditions. The required train, including its associated electrical safety bus, is usually maintained in a "protected" status while testing and work activities are conducted on the other bus. In some or many of the noted events below, the bus that was momentarily or inadvertently de-energized was the "unprotected" bus.)

| Event Date | Event Summary   |
|------------|---|
| 10/18/84   | Inadvertent disturbance of relay gave false impression of a breaker trip. As a consequence, NB01 bus was temporarily, manually isolated.  |
| 3/16/86    | Loss of power to NB02 bus occurred during recovery from back-feed of the unit auxiliary transformer to the startup transformer. (Occurred during plant startup.)  |
| 10/28/87   | NB01 bus was inadvertently deenergized during restoration of power to the load shed emergency load sequencer (LSELS).   |
| 7/24/90    | Temporary loss of off-site circuit feed (trip of breaker 52-3) to NB01 bus due to inadvertent actuation of transfer trip relay.   |
| 6/23/89    | Relay failure resulted in loss of NB01 bus following turbine trip.  |
| 11/19/90   | Off-site circuit feed to NB01 bus was lost during repetitive attempts to synchronize main generator to grid, due to flashover relay actuation.  |
| 10/2/99    | Loss of NB02 bus occurred during ESFAS testing due to breaker problem. (Occurred during Refueling Outage 10.)   |
| 11/10/02   | Power to NB02 bus momentarily lost due to human error during bus transfer operation. (Occurred during refueling outage when NB02 was not the "required" bus, i.e., "B" train was not the required/protected equipment train.) |

Table 2

5. *Discuss if the following should be made Regulatory Commitments to decrease the risk (e.g., increase reliability of offsite power) associated with the proposed extended DG AOT:*
- A. *Evaluating the condition of the off-site power supply and switchyard prior to entering the extended AOT, if this is not included in the commitment provided in Attachment 6 to the application.*
  - B. *Not taking the steam-driven emergency feedwater pump out of service for planned maintenance activities, if this is not included in the commitment provided in Attachment 6 to the application.*
  - C. *Communication with the System Load Dispatcher including informing the dispatcher in advance of taking the DG out of service, and frequent contacts during the extended AOT to inform the dispatcher of the DG status and the power needs of the facility.*
  - D. *The on-shift Operations crews will discuss and review appropriate normal and emergency operating procedures upon or prior to assuming the Watch for the first time after having scheduled days off while the extended AOT is in effect.*

*In your response (to this and the remaining questions/requests), provide the provisions, limitations and additional compensatory actions (in addition to Attachment 6 of the application) that you would be committing to implement to assure adequate defense-in-depth and reduced risk during the proposed extended DG AOT.*

**Response:**

Items A, B, C and D above are individually addressed as follows:

- A. In Attachment 6 to ULNRC-04866, AmerenUE made the following commitment:  
  
"When removing a diesel generator (DG) from service to perform voluntary, on-line, preventive maintenance under the proposed, extended allowed outage time (AOT), the following restrictions will apply.
  - 1. Offsite power supply and switchyard conditions are to be conducive to an extended DG AOT, which includes ensuring that switchyard access is restricted and no elective maintenance within the switchyard is being performed that would challenge offsite power availability.
  - 2. No equipment or systems assumed to be available in the probabilistic risk analysis for supporting the extended DG AOT are removed from service."

Per the first commitment above, ensuring that offsite power supply and switchyard conditions are conducive to an extended DG AOT includes or is equivalent to "evaluating the condition of the offsite power supply and switchyard prior to entering the extended AOT." Therefore, this commitment has already been established.

- B. Per the second commitment from ULNRC-04866 noted above, and as will be specifically identified in the TS Bases per AmerenUE's proposed changes to the TS Bases, all three Auxiliary Feedwater trains are to be available when entry into the extended DG AOT / Completion Time is to be made. This includes the steam-driven auxiliary (emergency) feedwater pump, and therefore, this commitment has also already been established.
- C. This is an appropriate recommendation. Communication with the Load Dispatcher to inform him (her) of the extended DG removal from service and to verify suitable offsite power conditions/availability for the DG outage is consistent with the first commitment identified above with regard to ensuring that the "offsite power supply and switchyard conditions are conducive to an extended DG AOT." An action(s) or procedural step(s) for effecting this communication will be incorporated into the plant procedure(s) that implements the above commitment.
- D. No additional commitments or actions are deemed necessary with respect to this recommendation or concern, in light of the following:
- Plant operators are routinely trained on off-normal and emergency response procedures (including station blackout and/or loss of offsite power) as part of the operator requalification training cycle.
  - Training will be given on the provisions and contingencies associated with the extended DG AOT as part of the training to be given in support of the license amendment.
  - The TS bases will provide a sufficient level of detail regarding what conditions are to be met for entering the extended DG AOT / Completion Time.
  - Normal shift turnover includes a review of each LCO Condition / Required Action that is in effect at the time of the turnover.
  - Each TS LCO Condition / Required Action that is ongoing or in effect is also identified in the daily plant status meetings.

6. *Provide the make and model of the DGs at Callaway, and discuss what the manufacturer's recommended break-in and re-test requirements are.*

**Response:**

The DG engines at Callaway are Pielstick Model 2.5 engines and were manufactured by Fairbanks Morse. Each engine has 14 cylinders.

Fairbanks Morse does not specify post-maintenance retest requirements. Such requirements are based on what kind of work was done. For most cases, the retest requirement for restoring/confirming operability following DG maintenance is the one-hour run at full load, i.e., the start and load test requirements of Technical Specification (TS) Surveillance Requirements (SRs) 3.8.1.2 and 3.8.1.3. (Since these SRs are required to be performed routinely on a monthly basis, DG outage work has typically been scheduled such that the routine performance of these SRs can also serve to fulfill post-maintenance test requirements.) For cases when the maintenance might only involve, for example, replacement of the start pushbutton switch, the only retest requirement specified might be a DG start if the monthly load test was not yet due.

Historically, the only retest requirements typically specified for post-maintenance testing are the start and/or one-hour load tests, depending on what type of work was performed. A full 24-hour run (per SR 3.8.1.14), for example, has never been specified as a post-maintenance required test notwithstanding the fact that the test has always been routinely performed during refueling outages in accordance with the Technical Specifications. Even when the 24-hour run has been performed following DG maintenance during a refueling outage, DG operability has typically been considered to be confirmed after the initial one-hour run (if completed satisfactorily). To date, the 24-hour run has typically been scheduled following DG maintenance during refueling outages because it is prudent to do so and because it is most efficient to do it that way.

It should be noted that AmerenUE is currently seeking approval of TS changes proposed in another amendment application for Callaway<sup>\*</sup> would permit certain DG tests to be done during plant operation, given that many of the TS-required DG tests are currently prohibited from being performed during such conditions. Affected tests include, for example, the 24-hour endurance run. Upon approval of those TS changes, and consistent with past practice, such testing may continue to be scheduled following DG maintenance even when the maintenance is done during plant operation. In any case, the start and load (one-hour) test is still expected to be the primary test for confirming/restoring DG operability.

With regard to break-in requirements, Fairbanks Morse recommends break-in following liner or ring replacement and after bearing replacement. If main bearings or connecting rod bearings have been replaced, a one-hour run-in is recommended. If rings and liners have been replaced, a much more extensive break-in schedule is specified. It involves slow-speed runs increasing to normal-speed runs, unloaded. After that, lightly loaded runs are required, increasing to fully loaded runs in seven increments. The entire break-in procedure takes about 100 hours, but this

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<sup>\*</sup> Reference: Application for License Amendment, AmerenUE Letter ULNRC-04837, "License Amendment Request OL-1228 – Revision to Technical Specification Surveillance Requirements 3.8.1 and 3.8.4," from D. Shafer (AmerenUE) to USNRC, dated June 6, 2003.

can be reduced though the use of a break-in compound added to the fuel oil. If the engine has been disassembled, but no rings or liners have been replaced or honed (respectively), such that reassembly was done with the existing parts, the engine is not considered "refurbished" and no break-in is required. If a bearing(s) has been taken apart (and the same bearing was re-installed), a slow-speed run is required in order to verify acceptable temperatures before proceeding to any full-speed runs.

As noted in the response to Question 1, extensive refurbishment-type maintenance activities will not likely be voluntarily performed on the DGs during plant operation in light of the relatively short "extended" DG AOT proposed for Callaway.

### LIST OF COMMITMENTS

The following table identifies actions to which AmerenUE (Callaway) has committed in this document. Any other statements in this submittal are provided for information purposes and are not considered to be commitments. Questions regarding these commitments may be made to Dave Shafer, Superintendent – Licensing, at (314) 554-3104.

| Commitment   | Due Date/Event  |
|--|---|
| <p>An action(s) or procedural step(s) for effecting communication with the Load Dispatcher will be incorporated into the appropriate plant procedure(s).</p> <p>(This will apply when removing a diesel generator (DG) from service to perform voluntary, on-line, preventive maintenance under the proposed, extended allowed outage time (AOT). The intent is to inform the Load Dispatcher of the extended DG removal from service and to verify suitable off-site power conditions/availability for the DG outage.</p> | <p>Will become effective with implementation of the approved license amendment.</p> |