

June 14, 2004

Mr. Garry L. Randolph  
Vice President and Chief Nuclear Officer  
Union Electric Company  
Post Office Box 620  
Fulton, MO 65251

SUBJECT: CALLAWAY PLANT, UNIT 1 - ISSUANCE OF AMENDMENT RE: TECHNICAL SPECIFICATIONS 3.8.1 AND 3.8.4 – AC AND DC SOURCES (TAC NO. MB9664)

Dear Mr. Randolph:

The Commission has issued the enclosed Amendment No. 162 to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated June 6, 2003 (ULNRC-04837), as supplemented by letters dated December 19, 2003 (ULNRC-04909) and April 14, 2004 (ULNRC-04969).

The amendment revises several surveillance requirements (SRs) in TS 3.8.1 on alternating current sources for plant operation. The revised SRs have notes deleted or modified to adopt in part the Staff-approved TSTF-283, Revision 3, which will allow these revised SRs to be performed, or partially performed, in reactor modes that previously were not allowed by the TSs. The proposed changes to SRs 3.8.4.7 and 3.8.4.8 for direct current sources were withdrawn in your letter dated April 14, 2004. The enclosed Notice of Partial Withdrawal of Application for Amendment to Facility Operating License has been forwarded to the Office of the Federal Register for publication.

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,  
**/RA/**

Jack Donohew, Senior Project Manager, Section 2  
Project Directorate IV  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosures: 1. Amendment No. 162 to NPF-30  
2. Safety Evaluation  
3. Notice of Partial Withdrawal

cc w/encls: See next page

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\* EEIB memorandum dated 03/17/04

\*\* See previous concurrence

**ACCESSION NO.: ML041700128 TS Pages: ML041730368 Nrr-100 Pkg: ML041740120**

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| DATE   | 4/29/04   | 5/14/04   | 03/17/04  | 04/28/2004 | 2 June 2004 | 6/8/04    |

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 162  
License No. NPF-30

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Union Electric Company (UE, the licensee) dated June 6, 2003, as supplemented by letters dated December 19, 2003, and April 14, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. NPF-30 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 162 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This amendment is effective as of its date of issuance and shall be implemented within 60 days of the date of issuance including the incorporation of the changes to the Technical Specification Bases for Technical Specification 3.8.1 as described in the licensee's letters dated June 6 and December 19, 2003, and April 14, 2004.

FOR THE NUCLEAR REGULATORY COMMISSION

***/RA/***

Stephen Dembek, Chief, Section 2  
Project Directorate IV  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: June 14, 2004

ATTACHMENT TO LICENSE AMENDMENT NO. 162

FACILITY OPERATING LICENSE NO. NPF-30

DOCKET NO. 50-483

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

REMOVE

3.8-8  
3.8-9  
3.8-10  
3.8-11  
3.8-12  
3.8-13  
3.8-14

INSERT

3.8-8  
3.8-9  
3.8-10  
3.8-11  
3.8-12  
3.8-13  
3.8-14

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 162 TO FACILITY OPERATING LICENSE NO. NPF-30

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

1.0 INTRODUCTION

By application dated June 6, 2003, as supplemented by letters dated December 19, 2003, and April 14, 2004, Union Electric Company (the licensee) requested changes to the Technical Specifications (TSs, Appendix A to Facility Operating License No. NPF-30) for the Callaway Plant, Unit 1 (Callaway). The amendment, as originally submitted in the application, would modify several surveillance requirements (SRs) in Technical Specifications (TSs) 3.8.1 and 3.8.4 on alternating current (AC) and direct current (DC) sources, respectively, for plant operation. The revised SRs would have notes deleted or modified to allow the SRs to be performed, or partially performed, in reactor modes that are currently not allowed by the TSs. The current SRs are not allowed to be performed in Modes 1 and 2, and several of the SRs also cannot be performed in Modes 3 and 4. The purpose of the proposed amendment is to allow testing of the following AC and DC electrical sources in modes not currently allowed: the qualified circuits between the offsite transmission network and the onsite Class 1E electrical power distribution system, the emergency diesel generators (EDGs), and the DC electrical power subsystem.

The proposed changes to SRs 3.8.4.7 (battery service test) and 3.8.4.8 (battery discharge test), for the DC electric power subsystems were withdrawn by the licensee in its letter of April 14, 2004.

The proposed changes would do the following:

- Delete notes in SR 3.8.1.10 (EDG full-load rejection test), SR 3.8.1.13 (EDG protective-trip bypass test), and SR 3.8.1.14 (EDG endurance and margin test) to allow performing the required testing during Modes 1 and 2.
- Revise notes to remove restrictions in SR 3.8.1.11 (emergency bus and EDG loss-of-offsite-power (LOOP) test), SR 3.8.1.12 (EDG safety injection actuation signal test), SR 3.8.1.16 (EDG synchronizing test), SR 3.8.1.17 (EDG test mode change-over test), SR 3.8.1.18 (load block sequencing test), and SR 3.8.1.19 (emergency bus and EDG combined safety injection actuation signal and LOOP test) to allow performance, or partial performance, of the SRs during currently prohibited modes in order to

re-establish operability following corrective maintenance, modifications, deficient or incomplete surveillance testing, and other operability concerns during plant operation.

These changes adopt in part the Nuclear Regulatory Commission-approved changes to the Standard Technical Specifications (STS) in Industry/Technical Specification Task Force (TSTF) 283, Revision 3 (TSTF-283) on eliminating mode restrictions on the performance of surveillances in TSs 3.8.1. The NRC has approved the TSTF for inclusion in the improved STS in NUREG-1431 for Westinghouse plants, and for consideration for being added to plant TSs. The intent of the TSTF is to allow testing of the EDGs and Class 1E batteries in modes not currently allowed for the purpose of maintaining or reestablishing system or component operability (e.g., post maintenance testing), provided a safety assessment is made before the testing for operability.

As stated in the application, the above changes in TS 3.8.1 for the AC electric sources would provide the licensee with flexibility in outage scheduling and reduce outage critical path time since these EDG surveillance tests would no longer have to be performed during an outage. In addition, the changes will potentially allow the licensee to avoid a plant shutdown if corrective maintenance (planned or unplanned) performed during power operation results in the need to perform any of the above surveillances to demonstrate operability and to maximize its flexibility in responding to an event during shutdown when other engineered safety feature equipment may be out-of-service.

The licensee's description of the proposed changes, technical analysis, and regulatory analysis in support of its proposed license amendment is given in Sections 2.0, 4.0 and 5.2, respectively, of the licensee's application.

The licensee also provided responses to questions in an e-mail sent to the licensee (see ADAMS Accession No. ML040620699). The questions were to have the licensee clarify information on operational restrictions in the licensee's application and supplemental letter. The additional information provided in the e-mail and the supplemental letters dated December 19, 2003, and April 14, 2004, does not expand the scope of the application as noticed and does not change the NRC staff's original proposed no significant hazards consideration determination published in the *Federal Register* on July 22, 2003 (68 FR 43394).

## 2.0 REGULATORY EVALUATION

The proposed amendment involves the surveillance testing of the emergency buses and EDGs that currently are not allowed in Modes 1 and 2. The regulatory requirements involved are as follows:

- General Design Criterion (GDC) 17, "Electric power systems," of Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10, Part 50, of the *Code of Federal Regulations* (CFR), requires, in part, that nuclear power plants have onsite and offsite electric power systems to permit the functioning of structures, systems, and components that are important to safety. The onsite system is required to have sufficient independence, redundancy, and testability to perform its safety function, assuming a single failure. The offsite power system is required to supply power from two physically independent circuits that are designed and located so as to minimize, to the extent

practical, the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. In addition, this criterion requires provisions to minimize the probability of losing electric power from the remaining electric power supplies as a result of loss of power from the unit, the offsite transmission network, or the onsite power supplies.

- GDC-18, "Inspection and testing of electric power systems," requires that electric power systems that are important to safety must be designed to permit appropriate periodic inspection and testing.
- 10 CFR 50.36(c)(3), "Technical Specifications," requires a licensee's TSs to have SRs relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operations are within safety limits, and that the limiting conditions for operation (LCOs) will be met. The SRs may include mode restrictions based on the safety aspects of conducting the surveillances in excluded reactor modes.

In Appendix 3A of the Callaway Final Safety Analysis Report (FSAR), the licensee addresses how it conforms to NRC Regulatory Guides (RGs). RG 1.9, "Selection, Design, Qualification and Testing of Emergency Diesel Generator Units Used As Class 1E Onsite Electric Power Systems at Nuclear Power Plants," provides recommendations on the reactor modes during which the EDGs should be tested, which is the subject of the proposed amendment. For RG 1.9, Revision 3, dated July 1993, the licensee states the following in the FSAR:

With regard to periodic, in-service testing of the diesel generators per Revision 3 of this regulatory guide, testing is performed in accordance with the plant Technical Specifications. The testing requirements of the Technical Specifications are based on the recommendations of Regulatory Guide 1.9 (Rev. 3) and Regulatory Guide 1.108 (the pertinent testing guidance of which, with some changes, was incorporated into Regulatory Guide 1.9, Revision 3). Differences between the test requirements of the Technical Specifications and the recommendations of the regulatory guides are due to the Standard Technical Specifications and/or approved changes to the Technical Specifications.

RG 1.9, Revision 3, does not recommend testing of the EDG in Modes 1 and 2. Therefore, if the proposed amendment is approved, the testing requirements in the TSs will be different from that recommended in the RG. However, because the licensee has included the statement in the FSAR that "Differences between the test requirements of the Technical Specifications and the recommendations of the regulatory guides are due to the Standard Technical Specifications and/or approved changes to the Technical Specifications," the licensee would not need to revise Appendix 3A of the FSAR when this amendment is approved. The reason being that the differences between the testing recommendations in the RG and the testing requirements in the TSs would be the result of approving the proposed amendment to the TSs. Changes to the design of the plant as described in the FSAR that are approved by the NRC are required to be included in an update of the FSAR on a schedule in accordance with 10 CFR 50.71(e).

### 3.0 BACKGROUND

The onsite power system for Callaway is provided with preferred power from the offsite system through two physically independent sources of power in accordance with GDC 17. With regard to the safety-related (Class 1E) power supply configuration, one preferred circuit from the switchyard supplies power to a multi-winding startup transformer, one winding of which feeds a 13.8/4.16-kV engineered safety feature (ESF) transformer. The second preferred (offsite) circuit supplies power from the switchyard via a safeguards transformer to a second 13.8/4.16-kV ESF transformer. Each ESF transformer supplies power to an associated Class 1E 4.16-kV bus. For each safety-related bus normally fed by its associated ESF transformer, the capability exists for either bus to be supplied via the other preferred (offsite) source connection.

The onsite power system is generally divided into two load groups. Each load group consists of an arrangement of buses, transformers, switching equipment, and loads fed from a common power supply. Each load group is independently capable of safely bringing the plant to a cold shutdown condition, as the Class 1E electrical power distribution system is designed to satisfy the single-failure criterion.

The onsite standby power system includes Class 1E AC and DC power supply capability for equipment used to achieve and maintain a cold shutdown of the plant and to mitigate the consequences of a design basis accident. With regard to the Class 1E AC power, each of the two Class 1E load groups, at the 4.16-kV bus level, is capable of being powered from an independent EDG (one per load group) which functions to provide power in the event of a loss of the preferred (offsite) power source. Undervoltage relays are provided for each 4.16-kV bus to detect an undervoltage condition and automatically start the EDG in response to such a condition. The Class 1E DC system includes four separate 125-VDC battery supplies for Class 1E controls, instrumentation, power, and control inverters.

In the event of a loss-of-coolant accident (LOCA), LOOP, or both, the starting (or shedding and restarting) of Class 1E electrical loads is controlled by the load shedding emergency load sequencers (LSELS), one of which is provided for each 4.16-kV bus. In the event of a LOCA with preferred (offsite) power available to the 4.16-kV Class 1E bus(es), Class 1E loads are started in programmed time increments by the load sequencer(s). The associated EDG will be automatically started but not connected to the bus. However, in the event that preferred (offsite) power is lost, the load sequencer will function to shed selected loads and automatically start the associated standby EDG. The load sequencer(s) will function to start the required Class 1E loads in programmed time increments.

### 4.0 TECHNICAL EVALUATION

To allow testing of AC electrical sources, in TS 3.8.1, in modes not currently allowed, the licensee has proposed the following changes to the TSs:

1. Delete the note stating surveillance shall not be performed in Modes 1 and 2 for SR 3.8.1.10 to verify each EDG at a power factor will not trip and voltage is maintained following a load rejection.

2. Revise Note 2 to allow performance of portions of SR 3.8.1.11, in Modes 1 and 2, to verify de-energization of emergency buses, load shedding from emergency buses, and EDG auto-starts from standby condition on an actual or simulated loss of offsite power signal.
3. Revise Note 2 to allow performance of portions of SR 3.8.1.12, in Modes 1 and 2, to verify EDG auto-starts from standby condition on an actual or simulated safety injection signal (SIS).
4. Delete the note stating surveillance shall not be performed in Modes 1 and 2 for SR 3.8.1.13 to verify each EDG's automatic trips are bypassed on an actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated SI signal.
5. Delete Note 2 (and renumber the remaining notes) stating surveillance shall not be performed in Modes 1 and 2 for SR 3.8.1.14 to verify each EDG operating for 24 hours.
6. Revise note to allow performance of SR 3.8.1.16, in Modes 1 through 4, to verify each EDG synchronizes with offsite power source, transfers loads to offsite power source, and returns to ready-to-load operation.
7. Revise note to allow performance of portions of SR 3.8.1.17, in Modes 1 and 2, to verify, with an EDG operating in test mode and connected to its bus, an actual or simulated SI signal overrides the test mode.
8. Revise note to allow performance of SR 3.8.1.18, in Modes 1 and 2, to verify interval between each sequenced load block for each LOCA and shutdown sequencer.
9. Revise Note 2 to allow performance of portions of SR 3.8.1.19, in Modes 1 and 2, to verify de-energization of emergency buses, load shedding from emergency buses, and EDG auto-starts from standby condition on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated SI signal.

In revising or deleting the notes for the above SRs, the licensee is not changing either the frequency of conducting the SRs, the surveillance to be performed, or the performance criteria specified in the SRs. The only change is to the reactor modes that the surveillance may be performed.

For SRs 3.8.1.10, 3.8.1.13, and 3.8.1.14, the note that states "This Surveillance shall not be performed in MODE 1 or 2" would be deleted. Therefore, these SRs could be performed in any reactor modes including Modes 1 and 2.

For SRs 3.8.1.11, 3.8.1.12, 3.8.1.17 and 3.8.1.19, the notes would be revised such that the current note stating "This Surveillance shall not be performed in MODE 1 or 2" would be revised to state that "This Surveillance shall not normally be performed in Mode 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced." The changes to the current note are underlined. Therefore, portions of these SRs to re-establish operability could

be performed in Modes 1 and 2, but an assessment must be performed by the licensee before the SRs are performed.

For SR 3.8.1.16, the note would be revised such that the current note stating "This Surveillance shall not be performed in MODE 1, 2, 3, or 4" would be revised to state that "This Surveillance shall not normally be performed in Mode 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced." The changes to the current note are underlined. Therefore, the SR could be performed in Modes 1 through 4, but an assessment must be performed by the licensee before the SRs are performed.

For SR 3.8.1.18, the note would be revised such that the current note stating "This Surveillance shall not be performed in MODE 1 or 2" would be revised to state that "This Surveillance shall not normally be performed in Mode 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced." The changes to the current note are underlined. Therefore, the SR could be performed in Modes 1 and 2, but an assessment must be performed by the licensee before the SRs are performed.

#### 4.1 AC Sources Discussion

The operability requirements for the onsite and offsite AC sources during plant operation in Modes 1, 2, 3, and 4 are specified in TS 3.8.1, "AC sources - Operating." TS 3.8.1 includes SRs for monitoring the offsite sources and testing the EDGs. Currently, SRs 3.8.1.10 (full-load rejection test), 3.8.1.13 (protective-trip bypass test), and 3.8.1.14 (endurance and margin test) must be performed while the plant is in a shutdown condition (i.e., Mode 5 or 6). While in Mode 5 or 6, TS 3.8.2 requires that one of the two EDGs remain operable. The licensee stated that the EDG being tested is typically not the EDG that is being maintained or credited as the operable EDG for satisfying TS 3.8.2.

The proposed changes would allow EDG testing to be performed during plant operation (i.e., in Modes 1, 2, 3, and 4) when both EDGs are required to be operable in accordance with TS 3.8.1. Therefore, the EDG under test would be required to be operable. Any condition associated with the testing that would not allow the EDG to be operable would require the licensee to declare the EDG inoperable and enter the required actions in TS 3.8.1 for an inoperable EDG.

##### 4.1.1 SRs 3.8.1.10, 3.8.1.13, and 3.8.1.14

The proposed changes to SR 3.8.1.10 (EDG full-load rejection test), SR 3.8.1.13 (EDG protective-trip bypass test), and SR 3.8.1.14 (EDG endurance and margin test) would remove the reactor mode restrictions in the SRs that prohibit performing the testing in Modes 1 and 2. The proposed changes are different from the changes to these SRs in TSTF-283 in that the TSTF changes would allow testing of the EDGs in Modes 1 and 2 only for reestablishing the operability of the EDGs. The licensee's proposed changes would allow these SRs to be (1) performed during Modes 1 and 2 to meet the surveillance frequency of once per 18 months, and (2) not scheduled during refueling outages. The licensee stated in its application that it proposed the changes to SRs 3.8.1.10, 3.8.1.13, and 3.8.1.14 to "help reduce the complexity of

coordinating work and testing activities during refueling outages and could potentially reduce outage critical path time" (i.e., reduce complexity by not performing these SRs in a refueling outage). The licensee's proposed changes to these SRs would also meet the intent of the TSTF to avoid a plant shutdown if maintenance of the EDGs were performed during power operation.

#### 4.1.1.1 LOOP, LOCA, and LOOP/LOCA Discussion

In reviewing the proposed changes to SRs 3.8.1.10, 3.8.1.13, and 3.8.1.14, the NRC staff considered postulated events associated with EDG start signals. There are three such events: a LOOP, LOCA, and LOCA with a LOOP (or LOOP/LOCA).

##### LOOP

In the event of a LOOP occurring while an EDG is running and paralleled to offsite power for testing, the EDG would continue supplying power to the loads on the safety bus as well as to the offsite system if no separation of the offsite source occurred. In this case, the bus undervoltage relays might not immediately trip if the bus voltage is being adequately supported by the EDG. At some point, however, the licensee stated that because loading would exceed the EDG's capability, the EDG would be unable to match load and either the bus undervoltage relays would trip (after timing out) or the EDG overcurrent or underfrequency relays would trip. The former would cause the feeder breakers in the offsite source connection to trip (but not the EDG output breaker); whereas the latter would cause the EDG output breaker to trip open.

The licensee stated that in lieu of a complete LOOP, a more likely scenario would be a degraded grid/grid loading condition while the plant is operating. In such a scenario, it is possible that the plant's main generator would support system voltage in the vicinity of the plant/switchyard so that the plant buses or EDG under test would not see the conditions that would otherwise exist if the plant were offline or tripped. The worst-case impact to the plant buses or EDG (including a change in the power demand on the EDG) would therefore not be seen until after the plant tripped in response to the grid condition (if a trip were to occur). However, degraded voltage protection would still be effective for protecting plant loads if bus voltage was degraded after the plant trip, and protective relaying would also still be effective for protecting the EDG. Based on the licensee's previous operating experience, such a grid condition would be identified by their contingency analysis computer at the licensee's Energy Supply Operations Center, which is in continuous use to monitor such conditions and to evaluate offsite source operability on an ongoing basis.

If the bus undervoltage relays (i.e., LOOP diesel generator start instrumentation required by TS 3.3.5) tripped in response to an undervoltage condition (after the relays timed out), the feeder breakers would trip to separate the offsite source. At the same time, the LOOP signal would initiate the LSELS which in turn would cause all but the permanently connected bus loads to be shed. Sequenced loads would then be loaded onto the bus via the blackout sequencer. Since the EDG would already be running and connected, the EDG start signal from the LOOP instruments would have no effect in that regard. At this point, the plant would respond as it would in response to a LOOP condition.

If the overcurrent or underfrequency relays tripped (i.e., before the degraded voltage relays tripped), the EDG output breaker would trip open. Immediately after the overcurrent or underfrequency relays opened the EDG output breaker, the resultant dead-bus condition would cause the LOOP instrumentation to trip which would then trip the feeder breakers open to fully isolate the offsite system from the bus. The EDG output breaker would then re-close, re-energizing the bus. At this point, the plant would respond as it would in response to a LOOP condition.

The overcurrent or underfrequency trips are the features intended to open the EDG output breaker without lockout. However, there are several non-essential EDG trip functions enabled when the EDG is in the test mode, i.e., paralleled with the offsite source, which are bypassed when the EDG is in the emergency mode. In the event that one of these functions is caused to trip, the EDG output breaker will open and lock out. Depending on the type of trip, the EDG may also trip and lock out. If one of these EDG protective trips were to occur in response to a disturbance in the offsite power system, operator action can be taken to manually reset the lockout relay of the EDG under test so that the EDG can be restarted and loads properly sequenced.

For the above, the worst-case effect of having an EDG under test when a LOOP occurs is potentially delaying the plant response to the LOOP (by several minutes), as operator action may be needed to reset the EDG lockout relay. In general, the time response to a LOOP is not critical, as there is no concurrent accident condition and the affected bus can be restored well within the time needed to effect safe shutdown. In addition, the other train would not be affected by the EDG under test, therefore its response to a LOOP would not be affected.

### LOCA

For an SIS (i.e., a LOCA occurs) while an EDG is under test (and paralleled to offsite power via the associated safety bus), the EDG response is as designed. In other words, the SIS overrides the test mode as follows: the LOCA signal will cause the EDG start circuitry to reset and trip the EDG output breaker. LSELS will initiate the LOCA sequence for required bus loads as the bus continues to be powered from the offsite source. The EDG will shift to the emergency mode and remain in standby/ready-to-load condition. This sequence is in accordance with the design basis, and therefore, for this scenario there is no impact to the analyzed plant response to the LOCA. The override capability mentioned above is periodically verified by test pursuant to TS SR 3.8.1.17. Furthermore, there is no impact to the other bus/EDG/load group since only the EDG under test is affected.

### LOCA with a LOOP

In the accident analyses of the Callaway Final Safety Analysis Report (FSAR), a LOCA is postulated to occur concurrently with a LOOP (i.e., a LOCA with a LOOP, or a LOOP/LOCA) for the purposes of providing a bounding analysis that challenges ESF equipment. The response of an EDG to a LOOP and LOCA while the EDG is being tested is dependent on which (i.e., a LOOP or LOCA) occurs first (or whether the two events occur simultaneously), as described further below.

If an EDG were under test, and a LOOP occurred simultaneously with a LOCA, the EDG output breaker would immediately open while the EDG would continue to run in the test condition (with its governor and voltage regulator reset). Non-essential loads would be shed from the bus via LSELS. In response to the LOOP condition, the bus feeder breakers would open to isolate the offsite power system from the bus. After a short time delay, the EDG output breaker would re-close onto the de-energized bus, and LSELS would sequence required loads onto the bus via the LOCA sequencer which, by design, takes precedence over the blackout sequencer.

For the case when the LOOP occurs just after a LOCA, the LOCA sequencer would still control bus loading. Initially, with offsite power still available, the LOCA signal would open the EDG output breaker while the EDG would continue to run (with its governor and voltage regulator reset). LSELS would begin to shed and sequence loads onto the bus. If a LOOP then occurred, the bus feeder breakers would open (to separate the offsite power system) and the LOCA sequencer would reset. Any loads that had been sequenced onto the bus would be shed. After a short time delay, the EDG output breaker would close onto the bus and the LOCA sequencer would again initiate the sequencing of required loads onto the bus.

For the case where a LOOP occurs prior to a LOCA (with the EDG in a test mode), the following sequence could be expected to occur. Initially, when the LOOP occurs, the sequence would be as described previously for a LOOP-only condition. The degraded voltage, overcurrent, or underfrequency relays would actuate, or possibly one of the non-essential relays would actuate. Then either of the aforementioned sequences would occur or begin to occur based on which of the noted trip functions occurred first (or in lieu of the other). The occurrence of a LOCA at this point would cause an SIS to be generated, but the subsequent response is dependent on which trip function was actuated in response to the LOOP.

- (1) If the degraded voltage relays had effected a separation of the offsite source in response to the LOOP, the SIS would cause the LOCA sequencer to go into effect.
- (2) If a non-essential relay had responded before the degraded voltage relays during the LOOP, an EDG lockout would be in effect. Although the non-essential trips are designed to be bypassed by an SIS, the SIS cannot reset a lockout that is already in effect. Operator action may be required to reset the lockout before the EDG is restarted in response to the LOOP-LOCA condition. The LOCA sequencer would then reload the bus with all required sequenced loads.

In summary, the licensee stated that the worst-case effect for some of the above scenarios is to delay but not preclude system responses to the SIS (i.e., a LOCA) for the affected bus. Furthermore, the licensee noted that there would be no impact to the other bus since only the EDG under test is affected. For the worst-case effect of having an EDG under test when a LOOP occurs is potentially delaying the plant response to the LOOP (by several minutes), the time response to a LOOP is not critical, as there is no concurrent accident condition and the affected bus can be restored well within the few minutes needed to effect safe shutdown. Based on the discussion above, on the LOOP, LOCA, and LOCA with a LOOP, the NRC staff concludes that the EDG may be safely tested in Modes 1 and 2.

The following is the staff's evaluation on the licensee's proposed changes to SRs 3.8.1.10, 3.8.1.13, and 3.8.1.14.

#### 4.1.1.2 SR 3.8.1.10

Performance of the full-load rejection test in accordance with SR 3.8.1.10 involves paralleling the EDG under test with the offsite power source while the offsite source is supplying the emergency bus, loading the EDG to the required load, and then opening the EDG output breaker. Opening the EDG output breaker separates the EDG from its associated emergency bus and allows the offsite circuit to continue to supply the bus. At Callaway, paralleling an EDG with the offsite source for testing does not render the EDG inoperable because an SIS will override the test mode to automatically return the EDG to a standby/ready-to-load condition. This design feature of the EDGs does not adversely affect the capability of the EDG to respond to an SIS.

The concern associated with performing the full-load rejection test in Mode 1, 2, 3, or 4, as described in the TS Bases for SR 3.8.1.10, is that disconnecting the EDG while it is supplying power to the vital buses could cause undesirable electrical perturbations on the buses. Additionally, the EDG being tested is susceptible to grid disturbances while it is paralleled to the offsite source, and is potentially more susceptible to tripping due to the extra protection trip relays that are cut in during the test. The EDG is paralleled with the offsite source for a limited period of time before tripping the EDG breaker.

In the event of a grid disturbance occurring while the EDG is paralleled to offsite power, protective relaying and instrumentation exists to mitigate the effects of such disturbances. With regard to plant loads connected to the associated safety bus and a grid disturbance involving a sustained low grid-voltage condition, the protection instrumentation required by TS 3.3.5, "Loss of Power Diesel Generator Start Instrumentation," would be available to respond to such a condition for protection of the plant loads. The loss of power (LOP) diesel generator start instrumentation is required for the ESF systems to function in any accident with a LOOP or degraded offsite power system. This instrumentation provides for the shedding and sequencing of safety-related loads in addition to sending a start signal to the EDGs. This instrumentation also provides for the protection of safety-related equipment against damage and the effects of inadvertent operation of overcurrent protection throughout its train. For this reason, the allowed outage time for multiple inoperable channels is restricted to that of the LSELS in LCOs 3.8.1 and 3.8.2 of the Callaway TS.

The LCO for LOP diesel generator start instrumentation requires that four channels per 4.16 kV Class 1E system bus of both the loss of voltage and degraded voltage functions shall be operable in Modes 1, 2, 3, and 4 when the LOP diesel generator start instrumentation supports safety systems associated with the ESFAS. The LOP diesel generator start instrumentation functions are required in Modes 1, 2, 3, and 4 because ESF systems are required to function in these modes. For the instance when one channel of the LOP diesel generator start instrumentation is inoperable, the inoperable channel is placed in trip within 6 hours. The trip logic would then be a one-out-of-three versus two-out-of-four, which is more conservative. If two or more channels of the LOP diesel generator start instrumentation are inoperable the associated LSELS is declared inoperable immediately. This requires the EDG being tested to be declared inoperable.

In the licensee's response dated December 19, 2003, to an NRC staff request for additional information, the licensee noted that for the case when the EDG not under test becomes inoperable while an EDG test is underway, the decision to abort the test would be based on existing plant conditions, the purpose for performing the test, whether the test is one that affects EDG operability, what plant risk level is entered by the other EDG becoming inoperable, and the cause of the other EDG's inoperability, if known. The licensee also noted that for the case when the EDG under test becomes inoperable, it might be most prudent to complete the test if, for example, the test were being done to re-establish operability following corrective maintenance. If the EDG test had been initiated for routine on-line maintenance, the decision might be made to abort the test, particularly if the decision is made to protect the train associated with the EDG under test.

The decision to abort the test in the event of the other EDG becoming inoperable would also be influenced by the resultant entry into a more severe TS action statement for having both EDGs inoperable, which requires restoring one EDG to operable status within two hours. TS 3.8.1, Condition E would be entered for two EDGs inoperable, with Required Action E.1 requiring restoring one EDG to operable status in two hours. The testing remaining on one EDG and the cause of the failure on the opposite train EDG would result in determining the shortest time to restore one EDG to operable status. The decision on which EDG to restore first would depend on the current condition of each EDG, including whether the nature and cause of the failure of the other EDG is immediately known. The staff notes that the Maintenance Rule provision contained in 10 CFR 50.65(a)(4) states that before performing maintenance activities, the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. The above discussion provides an example of this process. In any case, TS 3.8.1, Condition E, adequately governs the situation.

Additionally, the licensee noted that the highest voltage level at which the degraded voltage relays may actuate, and not reset, is 91.5 percent of nominal and that the relays have a time delay of 119 +/-11 seconds before an actuation can occur. The licensee stated that this voltage level and time duration are not significantly approached during the load rejection test. Furthermore, the licensee's experience with this test has shown that the voltage perturbation seen on the bus during and just after the load rejection is within a five percent change, and, therefore, not significant.

#### 4.1.1.3 SR 3.8.1.13

SR 3.8.1.13 requires verification that the non-emergency automatic protective trip functions for each EDG are bypassed on a loss-of-voltage signal concurrent with an SIS. The licensee currently performs this test apart from testing of the EDG because it does not require running the EDG. The test procedure calls for opening and racking out the output breaker of the associated EDG, and involves simulating conditions such that the use of jumpers and blocking devices is needed. The EDG under test is therefore considered unavailable during performance of the test. The TS Bases for SR 3.8.1.13 currently notes that it is prohibited to perform this surveillance during Modes 1 and 2 since its performance requires removing a required EDG from service. The licensee reviewed the surveillance history for this test and determined that the average time to complete the test is less than 5 hours. This time period is significantly less than the current allowed outage time specified in the TS for an inoperable

EDG (i.e., 72 hours). Additionally, the licensee stated that the availability of the other EDG is maintained in a protected status during the performance of the subject surveillance.

#### 4.1.1.4 SR 3.8.1.14

Performance of the endurance and margin test in accordance with SR 3.8.1.14 involves synchronizing, paralleling, and loading the EDG with the offsite source and then running it continuously at its full-load capability for not less than 24 hours. In accordance with the Callaway TSs, during the 24-hour run the EDG must be loaded and run at 110 percent of its continuous duty rating for at least 2 hours if it has been determined that the auto-connected design loads have increased above the continuous duty rating of the EDG. As stated above, paralleling an EDG with the offsite source for testing does not render the EDG inoperable at Callaway. An SIS will override the test mode to automatically return the EDG to a standby/ready-to-load condition. This design feature of the EDGs does not adversely affect the capability of the EDG to respond to an SIS. The concern with performing the 24-hour endurance test in Modes 1, 2, 3, or 4 (as described in the TS Bases for SR 3.8.1.14) is that while an EDG is paralleled to the offsite source, the EDG is not independent of disturbances on the offsite power system, and the associated safety bus and train of equipment is not independent of any potential interaction between the EDG and the offsite system. Additionally, the licensee stated that the availability of the other EDG is maintained in a protected status during the performance of the subject surveillance. In the event of a grid disturbance occurring while the EDG is paralleled to offsite power, protective relaying and instrumentation will mitigate the effects of such disturbances (including the aforementioned LOP Diesel Generator Start Instrumentation). The licensee noted that if an EDG protective trip were to occur in response to a disturbance in the offsite power system, operator action can be taken to manually reset the lockout relay of the EDG under test (assuming that the condition which caused the trip was promptly cleared or isolated) so that the EDG can be restarted and loads properly sequenced, if required.

#### 4.1.1.5 Conclusion

Based on the above, the NRC staff finds that the proposed changes to SR 3.8.1.10, SR 3.8.1.13, and SR 3.8.1.14, to allow testing the EDG in Modes 1 and 2, will not put the plant in an unsafe condition.

#### 4.1.2 SRs 3.8.1.11, 3.8.1.12, 3.8.1.16, 3.8.1.17, 3.8.1.18, and 3.8.1.19

The licensee proposed changes that would modify SR 3.8.1.11 (emergency bus and EDG LOOP test), SR 3.8.1.12 (EDG safety injection actuation signal test), SR 3.8.1.16 (EDG synchronizing test), SR 3.8.1.17 (EDG test mode change-over test), SR 3.8.1.18 (load block sequencing test), and SR 3.8.1.19 (emergency bus and EDG combined safety injection actuation signal and LOOP test) to allow the performance or partial performance of these surveillances during currently prohibited modes in order to re-establish operability following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated operability concerns during plant operation. The TS changes will incorporate a note in each affected SR to permit testing during currently prohibited modes to re-establish operability, if required, "provided an assessment determines the safety of the plant is maintained or enhanced." The changes for these SRs are the same as those given in

TSTF-283. The licensee stated that it will update the Callaway TS Bases to be consistent to provide guidance relative to the safety assessment.

Because SRs 3.8.1.11, 3.8.1.12, 3.8.1.17, and 3.8.1.19 are more complicated or intrusive than other SRs and would involve too great an impact or perturbation to the plant to be entirely performed during plant operation, the revised note for these SRs permits a partial performance (i.e., portions of the surveillance or a partial surveillance) of the applicable SR to reestablish operability.

Because (1) the proposed notes require a safety assessment to be performed by the licensee before conducting the surveillance to ensure that plant safety is maintained or enhanced, and (2) the full or partial performance of the SR is to demonstrate operability of the EDGs, the NRC staff does not know why an unsafe condition should exist when the licensee performs any of these SRs in reactor modes not currently allowed. Allowing the licensee to make the determination that performance of these SRs in modes not currently allowed maintains or enhances the safety of the plant, is similar to the regulation 10 CFR 50.59 in which the licensee is allowed to make changes to the plant as described in the FSAR if the changes meets the criteria given in the regulation. The criteria for this situation is that the licensee must determine that in conducting the SR the "safety of the plant is maintained or enhanced."

Based on the above, the NRC staff finds that the proposed changes to SRs 3.8.1.11, 3.8.1.12, 3.8.1.16, 3.8.1.17, 3.8.1.18, and 3.8.1.19, to allow testing the EDGs in Modes 1 and 2 and for SR 3.8.1.16 in Modes 3 and 4, will not put the plant in an unsafe condition, and are consistent with the TSs in TSTF-283, Revision 3, and NUREG-1431, Revision 2.

#### 4.2 Amendment Conclusions

The design of the onsite and offsite electric power systems for Callaway to permit the functioning of structures, systems, and components that are important to safety is not being changed by the proposed amendment. Further, the amendment does not change the testing of the EDG, only the modes in which the testing is conducted. Therefore, the plant continues to meet GDC 17.

The ability to inspect and test the safety-related electric power systems for Callaway, which must be designed to permit appropriate periodic inspection and testing, are not being changed by the amendment. Therefore, the plant continues to meet GDC 18.

For the reasons discussed in Section 4.1 above, the NRC staff concludes that the proposed changes to SRs 3.8.1.10 through 3.8.1.14 and SRs 3.8.1.16 through 3.8.1.19, to allow testing the EDG in Modes 1 and 2 and for SR 3.8.1.16 in Modes 3 and 4, are acceptable. Therefore, based on this, the NRC staff also concludes that the amendment meets 10 CFR 50.36(c)(3).

Because the NRC staff has concluded that the proposed amendment meets GDC 17, GDC 18, and 10 CFR 50.36(c)(3), the NRC staff also concludes that the proposed changes to TS 3.8.1 for AC power sources are acceptable.

### 4.3 Regulatory Commitment

In its application and in its supplemental letter dated December 19, 2003, which is the licensee's response to the NRC staff's request for additional information (RAI) dated September 25, 2003, the licensee described how it would manage the risk of testing the EDG in modes not currently allowed by the TSs. In addition, the licensee provided the following commitment in Attachment 2 to its supplemental letter dated December 19, 2003:

For the performance of surveillance testing pursuant to Technical Specification Surveillance Requirement (SR) 3.8.1.10 or SR 3.8.1.14 during plant operation, guidance will be included in the affected surveillance procedures for ensuring that consideration is given to restricting switchyard access and prohibiting elective maintenance within the switchyard that could challenge offsite power available or create the potential for electrical disturbances.

The NRC staff asked the licensee to clarify if its application and supplemental letter dated December 19, 2003, encompassed the following specific restrictions on the switchyard during the testing of the EDG in Modes 1 and 2 while the EDG is connected to the offsite power supply:

1. Weather conditions will be evaluated prior to testing the EDG in Modes 1 and 2 connected to the offsite power supply and the testing would not be conducted for severe weather watches or warnings.
2. The condition of the offsite power supply will be evaluated prior to testing the EDG in Modes 1 and 2 connected to the offsite power supply and testing would not be conducted if the offsite power supply is being challenged.
3. No discretionary switchyard maintenance, including the main, auxiliary, or startup transformers, will be allowed during testing of the EDG in Modes 1 and 2 connected to the offsite power supply.
4. No maintenance or testing that affects the reliability of the train not associated with the EDG being tested (i.e., the train associated with the EDG not being tested) will be conducted during testing of the EDG in Modes 1 and 2 connected to the offsite power supply. If any testing or maintenance of train must be performed at this time, then a 10 CFR 50.65(a)(4) evaluation will be performed prior to the EDG testing connected to the offsite power supply.

The licensee's response (ADAMS ML040620699) was that its discussion in its application and supplemental letter dated December 19, 2003, and the regulatory commitment above, encompassed the above restrictions. The licensee also submitted a letter dated April 14, 2004, wherein it stated that it would add to the TS Bases for SR 3.8.1.14 a statement that administrative controls for performing SR 3.8.1.14 in Modes 1 or 2 with the EDG connected to the grid would ensure that weather conditions are conducive for performing the SR, the offsite power supply and the switchyard conditions are conducive for performing the SR, and no

equipment or systems assumed to be available for supporting the performance of the SR are removed from service. The statement to be added to the TS Bases for SR 3.8.1.14 captures the conditions that the staff is concerned about and listed above.

Based on the above evaluation, the NRC staff also concludes that the commitment given above that the licensee has made as regulatory commitments (i.e., are being included in the licensee's commitment tracking system) are reasonable and sufficient for the amendment. As such, they are acceptable as regulatory commitments in that if the licensee would make any changes to these commitments that have safety significance, the licensee will inform the NRC staff.

The licensee stated it would implement the above commitment for SRs 3.8.1.10 and 3.8.1.14 at the time the affected surveillance procedures for the SRs are revised to allow such testing to be done in Mode 1 or 2. This may be after the amendment is implemented. The NRC staff concludes that this is acceptable because the above commitments would be implemented before an EDG is tested in accordance with SRs 3.8.1.10 or 3.8.1.14.

#### 4.4 Conclusion

Based on the evaluation given above and because the proposed amendment meets GDC 17, GDC 18, and 10 CFR 50.36(c), the NRC staff concludes that the amendment to SRs 3.8.1.10 through 3.8.1.14 and SRs 3.8.1.16 through 3.8.1.19 is acceptable.

#### 4.5 Changes to the TS Bases

The licensee presented the changes to the TS Bases for the proposed amendment in Attachment 4 to its application and in the letters dated December 19, 2003, and April 14, 2004. The NRC staff has reviewed the changes to the TS Bases for TS 3.8.1 and has no disagreement with these changes. As a condition of the amendment, the licensee will incorporate these changes to the TS Bases as part of its implementation of the amendment.

#### 5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Missouri State official was notified of the proposed issuance of the amendment. The State official had no comments.

#### 6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (68 FR 43394). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

## 7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Matt McConnell

Date: June 14, 2004

UNITED STATES NUCLEAR REGULATORY COMMISSIONUNION ELECTRIC COMPANYDOCKET NO. 50-483NOTICE OF PARTIAL WITHDRAWAL OF APPLICATION FOR  
AMENDMENT TO FACILITY OPERATING LICENSE

The U.S. Nuclear Regulatory Commission (the Commission) has granted the request of Union Electric Company (the licensee) to partially withdraw its June 6, 2003, application for proposed amendment to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1, located in Callaway County, Missouri.

The proposed amendment would modify several surveillance requirements (SRs) in Technical Specifications (TSs) 3.8.1 and 3.8.4 on alternating current and direct current sources, respectively, for plant operation. The revised SRs would have notes deleted or modified to allow the SRs to be performed, or partially performed, in reactor modes that are currently not allowed by the TSs. The current SRs are not allowed to be performed in Modes 1 and 2. Several of the current SRs also cannot be performed in Modes 3 and 4.

The Commission had previously issued a Notice of Consideration of Issuance of Amendment published in the *Federal Register* on July 22, 2003 (68 FR 43394). However, by letter dated April 14, 2004, the licensee partially withdrew that portion of the amendment request pertaining to the proposed changes to TS 3.8.4.

For further details with respect to this action, see the application for amendment dated June 6, 2003, and the licensee's letter dated April 14, 2004, which partially withdrew the application for license amendment. Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), located at One White Flint North, Public File Area O1 F21, 11555 Rockville Pike (first floor), Rockville, Maryland. Publicly available records will be

accessible electronically from the Agencywide Documents Access and Management Systems (ADAMS) Public Electronic Reading Room on the internet at the NRC Web site, <http://www.nrc.gov/reading-rm/adams/html>. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS, should contact the NRC PDR Reference staff by telephone at 1-800-397-4209, or 301-415-4737 or by email to [pdr@nrc.gov](mailto:pdr@nrc.gov).

Dated at Rockville, Maryland, this 14th day of June 2004.

FOR THE NUCLEAR REGULATORY COMMISSION

***/RA/***

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