



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

May 2, 2007

Charles D. Naslund, Senior Vice
President and Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, MO 65251

SUBJECT: CALLAWAY PLANT - NRC INTEGRATED INSPECTION
REPORT 05000483/2007002

Dear Mr. Naslund:

On March 24, 2007, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Callaway Plant. The enclosed report documents the inspection findings, which were discussed on March 29, 2007, with Mr. T. E. Hermann, Vice President Engineering, and other members of your staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

This report documents three findings that were evaluated under the risk Significance Determination Process as having very low safety significance (Green). The NRC has determined that violations are associated with two of these issues. These violations are being treated as noncited violations, consistent with Section VI.A of the Enforcement Policy. The noncited violations are described in the subject inspection report. If you contest these violations or the significance of these noncited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Callaway Plant facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Vincent G. Gaddy, Chief
Project Branch B
Division of Reactor Projects

Docket: 50-483
License: NPF-30

Enclosure:
NRC Inspection Report 05000483/2007002
w/attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket: 50-483
License: NPF-30
Report Number: 05000483/2007002
Licensee: Union Electric Company
Facility: Callaway Plant
Location: Junction Highway CC and Highway O
Fulton, Missouri
Dates: January 1 through March 24, 2007
Inspectors: M. S. Peck, Senior Resident Inspector
D. E. Dumbacher, Resident Inspector
J. R. Groom, Project Engineer, Branch E
C. H. Young, Resident Inspector, Arkansas Nuclear One
Approved By: V. G. Gaddy, Chief, Project Branch B

SUMMARY OF FINDINGS

IR 05000483/2007002; 01/01/2007 - 03/24/2007; Callaway Plant: Surveillance Testing and Identification and Resolution of Problems.

This report covered a 3-month inspection by resident inspectors. Two Green noncited violations and a Green finding were identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the significance determination process does not apply may be Green or assigned a severity level after NRC management review. The NRC's program of overseeing the safe operation of commercial nuclear power reactors is described in NUREG 1649, "Reactor Oversight Process," Revision 3, dated July 2000.

Inspector-Identified and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. The inspectors identified a finding after volume control tank inventory was inadvertently diverted from the reactor coolant system due to inadequate management of an operator workaround. On January 19 and March 22, 2007, operators had isolated the volume control tank from the demineralizer during resin transfer operations. However, volume control tank inventory was lost due to leakage past closed demineralizer isolation valves. Degraded Grinnell diaphragm valves have been a longstanding Callaway Plant material condition problem. Plant operations did not track nor effectively work around the degraded demineralizer valves.

This finding is greater than minor because the failure to adequately manage operator workarounds could reasonably be viewed as a precursor to a significant event. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the inspectors determined that this finding is only of very low significance because the condition did not result in the reactor coolant system technical specification leakage limit being exceeded, did not contribute to both the likelihood of a reactor trip and the likelihood that mitigating equipment or functions would be unavailable, and did not increase the likelihood of a fire or internal/external flood. This finding has a crosscutting aspect in the area of human performance associated with the work control component because AmerenUE did not plan work activities to support long-term equipment reliability by limiting operator workarounds. The licensee entered this finding into their corrective action program as Callaway Action Request 200700517 (Section 4OA2).

Cornerstone: Mitigating Systems

- Green. A self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," was identified after an inadequate surveillance procedure resulted in the inadvertent defeat of the Train B turbine-driven auxiliary feedwater pump automatic start feature and an unplanned actuation of a cross-train control room ventilation isolation. On February 12, 2007, plant instrumentation and control technicians were performing a control room ventilation response time test. The procedure required the operator to block a high radiation test signal. The operator was unable to locate the block switch. A

control room supervisor authorized a change to the procedure, which resulted in an incorrect block switch being used. The control room supervisor failed to verify correct block switch identification prior to authorizing the surveillance procedure change.

This finding is greater than minor because the failure to use an adequate surveillance procedure is associated with the mitigating systems cornerstone attribute of procedure quality and affects the objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the inspectors determined that this finding is only of very low significance because it was not a design or qualification deficiency, did not result in loss-of-safety function of a single train for greater than the technical specifications allowed outage time, and was not a potentially risk significant seismic, flooding, or severe weather event. This finding has a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because the control room supervisor did not thoroughly evaluate the apparent procedure problem before approving the change. This issue was entered into the licensee's corrective action program as Callaway Action Request 200701336 (Section 1R22).

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criteria XVI, after past corrective actions were inadequate to preclude recurrence of essential service water piping degradation due to corrosion. On March 14 and 23, 2007, plant personnel identified through-wall leaks in the Train B large bore essential service water piping. Plant operators declared the essential service water train inoperable and implemented elevated plant risk and required implementation of risk management actions in both cases. Plant technicians performed non-destructive examinations on about 10 percent of the accessible large bore piping. Technicians identified 93 indications of less than minimum pipe wall thickness. The licensee concluded the pipe degradation resulted from microbiologically influenced corrosion. Poor material condition of the essential service water system has been a longstanding problem at the Callaway Plant. On March 23, 2005, plant personnel identified an essential service water through-wall leak in large bore piping, which required a technical specification required shutdown and on January 25, 2006, plant operators declared Train B of the essential service water system inoperable due to a through-wall pipe leak. These conditions were identified as significant conditions adverse to quality in the licensee's corrective action program. The licensee's extent of condition review and corrective actions following the March 23, 2005, and January 25, 2006, occurrences were not adequate to prevent further examples of degraded essential service water piping from microbiologically influenced corrosion.

This finding is greater than minor because it is associated with the reactor safety mitigating systems cornerstone and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, this finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. This finding has a

crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because AmerenUE did not fully evaluate essential service water corrosion issues to ensure that the resolutions adequately addressed the causes and extent of condition needed to ensure nuclear safety. This issue was entered into the licensee's corrective action program as Callaway Action Request 200702724 (Section 4OA2).

REPORT DETAILS

Summary of Plant Status

The Callaway Plant was operating at full power at the beginning of the inspection period. On March 9, 2007, AmerenUE began a rapid power reduction from full power following a steam generator chemistry excursion. The chemistry excursion was caused by a failed condenser tube. Reactor operators manually tripped the reactor from 30 percent power after losing steam generator level control due to a feedwater regulating valve control failure. AmerenUE restarted the reactor on March 13, 2007, and operated at full power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (711111.01)

a. Inspection Scope

.1 Readiness for Seasonal Susceptibilities

The inspectors completed a review of the licensee's readiness of seasonal susceptibilities involving outdoor cold ambient temperatures. The inspectors: (1) reviewed plant procedures, the Final Safety Analysis Report (FSAR), and technical specifications to ensure that operator actions defined in adverse weather procedures maintained the readiness of essential systems; (2) walked down portions of the condensate system to ensure that adverse weather protection features (heat tracing, space heaters, and weatherized enclosures) were sufficient to support operability, including the ability to perform safe shutdown functions; (3) evaluated operator staffing levels to ensure the licensee could maintain the readiness of essential systems required by plant procedures; and (4) reviewed the corrective action program to determine if the licensee identified and corrected problems related to adverse weather conditions.

- January 11 and 17, 2007, condensate storage system. The inspectors verified the implementation of Procedure OTS-ZZ-00007, "Plant Cold Weather," by plant walkdown and review of the licensee's calculations for the potential of ice formation associated with the condensate storage tank vents.

The inspectors completed one seasonal susceptibility sample.

.2 Readiness for Impending Adverse Weather Conditions

The inspectors: (1) reviewed plant procedures, the FSAR, and technical specifications to ensure that operator actions defined in adverse weather procedures maintained the readiness of essential systems; (2) walked down portions of the below listed two systems to ensure that adverse weather protection features (heat tracing, space heaters, weatherized enclosures, temporary chillers) were sufficient to support

Enclosure

operability, including the ability to perform safe shutdown functions; (3) reviewed maintenance records to determine that applicable surveillance requirements were current before the anticipated severe thunderstorm developed; and (4) reviewed plant modifications, procedure revisions, and operator work arounds to determine if recent facility changes challenged plant operation.

- February 2, 2007, ultimate heat sink cooling tower during freezing conditions
- March 22, 2007, the inspectors verified the implementation of plant operations and protective measures during a thunderstorm watch

Documents reviewed by the inspectors included:

- Night Order, Cold Weather Operations, November 3, 2006
- Procedure OTS-ZZ-00007, Plant Cold Weather, Revision 11
- Callaway Action Request 200700194, Action 3, Evaluate Condensate Storage Tank Vents for Possible Blockage
- Drawing M-109-0081, Peripheral Roof Vent
- Callaway Action Request 200702676, Tornado Watch for Callaway County Causes Entry into Procedure OTO-ZZ-00012

The inspectors completed two system specific weather related condition samples.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

Partial Walkdowns

a. Inspection Scope

The inspectors: (1) walked down portions of four risk important systems and reviewed plant procedures and documents to verify that critical portions of the selected systems were correctly aligned; and (2) compared deficiencies identified during the walkdown to AmerenUE's FSAR and corrective action program to ensure problems were being identified and corrected.

- January 17, 2007, Train A Motor-driven Auxiliary Feedwater Pump
- February 6, 2007, Atmospheric Steam Dump Valves
- March 1, 2007, Train B Containment Spray System
- March 6, 2007, Train B Residual Heat Removal System

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed four samples.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

Quarterly Inspection

a. Inspection Scope

The inspectors walked down the 10 listed plant areas to assess the material condition of active and passive fire protection features and their operational lineup and readiness. The inspectors: (1) verified that transient combustibles and hot work activities were controlled in accordance with plant procedures; (2) observed the condition of fire detection devices to verify they remained functional; (3) observed fire suppression systems to verify they remained functional and that access to manual actuators was unobstructed; (4) verified that fire extinguishers and hose stations were provided at their designated locations and that they were in a satisfactory condition; (5) verified that passive fire protection features (electrical raceway barriers, fire doors, fire dampers, steel fire proofing, penetration seals, and oil collection systems) were in a satisfactory material condition; (6) verified that adequate compensatory measures were established for degraded or inoperable fire protection features and that the compensatory measures were commensurate with the significance of the deficiency; and (7) reviewed the FSAR to determine if AmerenUE identified and corrected fire protection problems.

- January 5, 2007, Fire Area RB, Reactor Building
- January 7, 2007, Fire Area A-10, Residual Heat Removal Heat Exchanger, Room 1310
- January 7, 2007, Area A-18, Electrical Penetration, Room 1410
- January 7, 2007, Fire Area A-21, Control Room Filtration, Room 1501
- January 18, 2007, Fire Area F-2, Fuel Pool Heat Exchanger, Room 6104
- January 18, 2007, Fire Area F-3, Fuel Pool Heat Exchanger, Room 6105
- March 6, 2007, Fire Area A-2, Train A Safety-related Pump Rooms
- March 6, 2007, Fire Area A-4, Train B Safety-related Pump Rooms
- March 20, 2007, Fire Area A-20, Personnel Hatch and Surge Tank Room

- March 20, 2007, Fire Area A-3, Boric Acid Tank Rooms

Documents reviewed by the inspectors included:

- Request for Resolution 18137, Establishment of Separation Zones in the Fuel Building, Revisions A, B, and C
- Callaway Action Request 200402208, Recommend Fire Protection Updates - Fuel Pool Cooling Heat Exchanger Room Doors
- Request for Resolution 16916, FSAR Fire Hazards Analysis Review, Revision 1

The inspectors completed 10 samples.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11Q)

Quarterly Inspection

a. Inspection Scope

The inspectors observed testing and training of senior reactor operators and reactor operators to identify deficiencies and discrepancies in the training, and to assess operator performance and the evaluator's critique. On February 7, 2007, the inspectors observed simulator training sessions involving plant shutdown preparations.

Documents reviewed by the inspectors included:

- Procedure OTG-ZZ-00006, Plant Cooldown Hot Standby to Cold Shutdown, Revision 43
- Simulator Scenario Guide Cycle 2007-1, Exercise 2, Course Code T61.0810

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q)

a. Inspection Scope

The inspectors reviewed the two listed maintenance conditions to: (1) verify the appropriate handling of structures, systems, and component performance or condition problems; (2) verify the appropriate handling of degraded structures, systems, or

component functional performance; (3) evaluate the role of work practices and common cause problems; and (4) evaluate the handling of structures, systems, or component issues reviewed under the requirements of the maintenance rule, 10 CFR Part 50, Appendix B, and the technical specifications.

- Callaway Action Request 200701336, Turbine-driven auxiliary feedwater pump inoperable due to mispositioning during maintenance procedure
- Callaway Action Request 200702384, Through-wall leak on Train B essential service water system piping

Documents reviewed by the inspectors included:

- Procedure EDP-ZZ-001128, Maintenance Rule Program, Revision 9
- Expert Panel Meeting Minutes, NET 06-0083, November 29, 2006
- Expert Panel Meeting Minutes, NET 07-0055, March 21, 2007

The inspectors completed two samples.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope

The inspectors reviewed the nine below listed assessment activities to verify: (1) performance of risk assessments when required by 10 CFR 50.65 (a)(4) and licensee procedures prior to changes in plant configuration for maintenance activities and plant operations; (2) the accuracy, adequacy, and completeness of the information considered in the risk assessment; (3) that the licensee recognizes, and/or enters as applicable, the appropriate licensee-established risk category according to the risk assessment results and licensee procedures; and (4) the licensee identified and corrected problems related to maintenance risk assessments.

- January 18, 2007, Planned Train B motor-driven auxiliary feedwater pump maintenance
- January 29, 2007, Inoperability of Turbine Trip/Reactor Trip P-9
- February 5-8, 2007, Planned Maintenance of the Steam Dump Valves
- February 26, 2007, Planned Maintenance of the Switchyard Safeguards Transformer
- February 28, 2007, Planned Turbine-driven Auxiliary Feedwater Pump Testing

- March 6, 2007, Emergent Train a Motor-driven Auxiliary Feedwater Inoperability During Planned Residual Heat Removal Pump Train a Maintenance
- March 15 and 16, 2007, Emergent Train B Essential Service Water and Emergency Diesel Generator Outage
- March 20, 2007, Planned Train B Degraded Voltage Testing of 4 kV Essential Bus
- March 21, 2007, Planned Train B Essential Service Water Underground Leakage Test

Documents reviewed by the inspectors included:

- PRA Evaluation Request 07-291, February 1, 2007, P-9 Out-of-Service 1, Revision 0
- PRA Evaluation Request 03-197, May 10, 2004, Safety Monitor Action Thresholds, Revision 0
- Procedure OTO-AD-00001, Loss of Condenser Vacuum, Revision 15

The inspectors completed nine samples.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors: (1) reviewed plant status documents such as operator shift logs, emergent work documentation, deferred modifications, and standing orders to determine if an operability determination was warranted for degraded components; (2) referred to the FSAR and design basis documents to review the technical adequacy of licensee operability determinations; (3) evaluated compensatory measures associated with operability determinations; (4) determined degraded component impact on any technical specifications; (5) used the significance determination process to evaluate the risk significance of degraded or inoperable equipment; and (6) verified that AmerenUE has identified and implemented appropriate corrective actions associated with degraded components.

- December 31, 2006, Callaway Action Request 200610488, Degraded Emergency Diesel Generator Fuel Oil
- January 4, 2007, Callaway Action Request 200700076, Failure to Comply with Commitment to NRC Bulletin 88-04 for Motor-driven Auxiliary Feedwater Pumps

- January 18, 2007, Callaway Action Request 200700499, Failure of the Emergency Diesel Generator to Respond to a Loss of Off-site Power Event While in Test Mode
- February 7, 2007, Callaway Action Request 200701140, Degraded Permissive P-10 on Nuclear Instrument Channel 44
- February 27, 2007, Callaway Action Request 200701776, Degraded Essential Service Water Piping
- March 6, 2007, Callaway Action Request 200702019, Motor-driven Auxiliary Feedwater Pump A Flow Discrepancies
- March 12, 2007, Callaway Action Request 200702175, Degraded Main Feedwater Regulating Valve C
- March 16, 2007, Callaway Action Requests 200702384 and 200702464, Degraded Train B Essential Service Water Piping, Pitted below Minimum Wall Thickness
- March 16, 2007, Callaway Action Request 200702396, Train A Essential Service Water Pump Discharge Line Crosstie Valve EFV0093 Leakby

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed nine samples.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors selected the six listed postmaintenance test activities of risk significant systems or components. For each item, the inspectors: (1) reviewed the applicable licensing-basis and/or design-basis documents to determine the safety functions; (2) evaluated the safety functions that may have been affected by the maintenance activity; and (3) reviewed the test procedure to ensure it adequately tested the safety function that may have been affected. The inspectors either witnessed or reviewed test data to verify that acceptance criteria were met, plant impacts were evaluated, test equipment was calibrated, procedures were followed, jumpers were properly controlled, the test data results were complete and accurate, the test equipment was removed, the system was properly re-aligned, and deficiencies during testing were documented. The inspectors also reviewed the FSAR to determine if AmerenUE identified and corrected problems related to postmaintenance testing.

- January 18, 2007, PMT 664550/910, Auxiliary Feedwater Valve ALHV0030 Repair
- January 18, 2007, PMT 0402999/900, Auxiliary Feedwater Pump Room Cooler B Preventive Maintenance
- January 23, 2007, PMT 04502380/900, Component Cooling Water Valve EGHV0062 Repair
- January 25, 2007, PMT 05512615/500, Leakage Test for Essential Service Water Isolation Valves
- March 13, 2007, PMT 0450340/500, Feedwater Regulating Valve C Actuator Replacement
- March 17, 2007, PMTs 0700231/900 and 0700231/910, VT-2 Inservice Leak Test and Return-to-service of Train B Essential Service Water Pump

Documents reviewed by the inspectors included:

- Procedure OSP-AL-V001B, Train B Auxiliary Feedwater Valve Operability, Revision 34
- Procedure OSP-EG-V002B, Containment Isolation Valve Stroke Test, Revision 9
- Callaway Action Request 200700759, Historical Compliance Issues with Technical Specification 3.7.8
- Procedure OSP-EF-P001B, Train B Essential Service Water Pump Surveillance, Revision 45

The inspectors completed six samples.

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities (71111.20)

The inspectors reviewed the following risk significant outage activities to verify defense in depth commensurate with the outage risk control plan and compliance with the technical specifications: (1) the risk control plan; (2) tagging/clearance activities; (3) reactor power reduction, post reactor trip recovery, shutdown risk management, approach to criticality, main generator synchronization and feedwater control transition; and (4) licensee identification and implementation of appropriate corrective actions associated with outage activities

Documents reviewed by the inspectors included:

- Procedure APA-ZZ-01021, Secondary Chemistry Program, Revision 21

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed the FSAR, procedure requirements, and technical specifications to ensure that the ten listed surveillance activities demonstrated that the structures, systems, or components tested were capable of performing their intended safety functions. The inspectors either witnessed or reviewed test data to verify that the following significant surveillance test attributes were adequate: (1) preconditioning; (2) evaluation of testing impact on the plant; (3) acceptance criteria; (4) test equipment; (5) procedures; (6) jumper/lifted lead controls; (7) test data; (8) testing frequency and method demonstrated technical specifications operability; (9) test equipment removal; (10) restoration of plant systems; (11) fulfillment of American Society of Mechanical Engineers code requirements; (12) updating of performance indicator data; (13) engineering evaluations, root causes, and bases for returning tested structures, systems, or components not meeting the test acceptance criteria were correct; (14) reference setting data; and (15) annunciators and alarms setpoints. The inspectors also verified that AmerenUE identified and implemented any needed corrective actions associated with the surveillance testing.

- December 19, 2006, Routine Surveillance 051148/500, Containment Cooler Thermal Performance Test Evaluation
- January 12, 2007, Routine Surveillance 055146/500, At-power Moderator Temperature Coefficient Measurement
- January 16, 2007, Surveillance 06530320/500, Train B Residual Heat Removal Pump Inservice Test
- January 18, 2007, Surveillance 06530279/500, Motor-driven Auxiliary Feedwater Pump B Inservice Test
- January 20, 2007, Surveillance 07500730/ST-04025, Reactor Coolant System Leak Rate Test
- January 30, 2007, Surveillance 07501039/ ST-04025, Reactor Coolant System Leak Rate Test

- February 7, 2007, Routine Surveillance OSP-ZZ-00001, Technical Specification Logs for Modes 1-4, 12-hour Shift, Attachment 1
- February 12, 2007, Routine Surveillance 04501639, Control Ventilation Time Response Channel IV
- March 3, 2007, Routine Surveillances 07501284 and 06529183, Locked Component Verification
- March 22, 2007, Routine Surveillances 06532516 through 06532519, Train A and Train B Slave Relay Tests

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed six routine, two reactor coolant system leakage, and two inservice test samples.

b. Findings

Inadequate Surveillance Procedure Resulted in an Inoperable Auxiliary Feedwater Pump

Introduction. A self-revealing Green noncited violation of Technical Specification 5.4.1.a, "Procedures," was identified after an inadequate surveillance procedure resulted in the inadvertent defeat of the Train B turbine-driven auxiliary feedwater pump automatic start feature and an unplanned actuation of a cross-train control room ventilation isolation.

Description. On February 12, 2007, plant instrumentation and control technicians began the Protection Channel IV control room ventilation response time test in accordance with Surveillance Procedure ISP-SA-00008, "Control Ventilation Time Response Channel IV." During the test, an unexpected cross-train trip of the control room ventilation isolation occurred. The isolation occurred when the technicians inserted a simulated high radiation signal into the system logic. Following the event, plant personnel also identified that the Train B turbine-driven auxiliary feedwater pump undervoltage and low-low steam generator level automatic start features had been inadvertently blocked.

Surveillance Procedure ISP-SA-00008 directed the operator to engage a block switch in "red train" Cabinet SA036D. This block switch prevents the high radiation test signal from initiating a control room ventilation cross-train trip when the response time is checked. The operator was unable to locate the switch in Cabinet SA036D. The switch was obscured by a label affixed to the outside of the glass cabinet door. The operator identified a similarly labeled switch in Cabinet SA036C, the adjacent "white train" cabinet. The operator assumed the surveillance procedure had referenced the incorrect cabinet. The operator brought the apparent procedural problem to the attention of the control room supervisor. The control room supervisor authorized a procedure change to allow use of the switch in Cabinet SA036C. The operator engaged the block switch in

Cabinet SA036C, inadvertently rendering the Train B turbine-driven auxiliary feedwater pump automatic start feature inoperable. The block switch was in the incorrect position for less than 1 hour. Because the correct block switch had not been manipulated, an unplanned cross-train trip of the control room ventilation isolation system occurred after the technicians inserted a high radiation signal into the logic.

Administrative Procedure APA-ZZ-00101, "Preparation, Review, and Approval of Written Instructions," Section 7.4, provided for correction of procedural discrepancies involving component identification after adequate information was used to verify correct identification. The control room supervisor did not adequately evaluate the procedure problem by verifying correct block switch identification prior to authorizing the surveillance procedure change.

Analysis. The failure to adequately evaluate an apparent procedure problem before authorizing the procedure change is a performance deficiency. This finding is greater than minor because the failure to use an adequate surveillance procedure is associated with the mitigating systems cornerstone attribute of procedure quality and affects the objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the inspectors determined that this finding is only of very low significance because it was not a design or qualification deficiency, did not result in loss-of-safety function of a single train for greater than the technical specifications allowed outage time, and was not a potentially risk significant seismic, flooding, or severe weather event. This finding has a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because the control room supervisor did not thoroughly evaluate the apparent procedure problem before approving the change.

Enforcement. Technical Specification 5.4.1.a, "Procedures," requires that written procedures be maintained covering the activities specified in Appendix A, "Typical Procedures for Pressurized Water Reactors," of Regulatory Guide 1.33, "Quality Assurance Program Requirements," February 1978. Regulatory Guide 1.33 Appendix A, Item 8.b (bb), required procedures for process radiation monitor surveillance testing. Contrary to the above, on February 12, 2007, AmerenUE failed to adequately maintain Surveillance Procedure ISP-SA-00008. Because this finding is of very low safety significance and was entered into the licensee's corrective action program (Callaway Action Request 200701336), this violation is being treated as a noncited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000483/2007002-01, Inadequate Surveillance Procedure Resulted in an Inoperable Auxiliary Feedwater Pump.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors reviewed the FSAR, plant drawings, procedure requirements, and technical specifications to ensure that the four listed temporary modification were properly implemented. The inspectors: (1) verified that the modifications did not have

an affect on system operability/availability; (2) verified that the installation was consistent with modification documents; (3) ensured that the postinstallation test results were satisfactory and that the impact of the temporary modifications on permanently installed structures, systems, or components were supported by the test; (4) verified that the modifications were identified on control room drawings and that appropriate identification tags were placed on the affected drawings; and (5) verified that appropriate safety evaluations were completed. The inspectors verified that the licensee identified and implemented any needed corrective actions associated with temporary modifications.

- January 17, 2007, Temporary Modification 07-003, Installation of Heat Tracing and Thermocouples on the Refueling Water Storage Tank, Revision 0
- January 18, 2007, Procedurally Controlled Temporary Modification, Work Task 06536279/500, Procedure OSP-A-P001B, Motor-driven Auxiliary Feedwater Pump B Inservice Test
- March 16, 2007, Temporary Modification 07-0009, Installation of Temporary Patch on Essential Service Water Pipe EF-009-HBC30, Revision 0
- March 17, 2007, Temporary Modification 07-0008, Installation of Temporary Seismic Supports on Piping of Train B of the Essential Service Water System, Revision 0

The inspectors completed four samples.

Documents reviewed by the inspectors included:

- Drawing M-109-00040, Refuel Water Storage Tank Vent
- Drawing M-109-040-22, Refueling Water Storage Tank Roof Design
- Calculation ARC-625, Design Basis Seismic Event Pipe Stress Analysis, Revision 0
- Procedure APA-ZZ-00605, Temporary Modifications, Revision 18

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

Cornerstone: Emergency Preparedness

a. Inspection Scope

On January 31, 2007, the inspectors observed Rapid Responder Table Top Drill 2007-01, which contributed to drill/exercise performance and emergency response organization performance indicators. The inspectors: (1) observed the training evolution to identify any weaknesses and deficiencies in classification, notification, and protective action requirements development activities; (2) reviewed the identified weaknesses and deficiencies against licensee identified findings to determine whether the licensee is properly identifying failures; and (3) determined whether licensee performance is in accordance with the guidance of the Nuclear Energy Institute 99-02, "Voluntary Submission of Performance Indicator Data," acceptance criteria.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

Cornerstone: Reactor Safety

a. Inspection Scope

The inspectors sampled licensee submittals for the performance indicators listed below for the period from December 2005 through December 2006. The definitions and guidance of Nuclear Energy Institute 99-02, "Regulatory Assessment Indicator Guideline," Revision 4, were used to verify the licensee's basis for reporting each data element in order to verify the accuracy of performance indicator data reported during the assessment period. The inspectors reviewed licensee event reports, out-of-service logs, operating logs, and the maintenance rule database as part of the assessment. In addition, the inspectors interviewed licensee personnel associated with performance indicator data collection, evaluation, and distribution.

- Mitigating System Performance Index - Emergency AC Power Systems
- Reactor Coolant System Specific Activity
- Reactor Coolant System Leak Rate

The inspectors completed three samples.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a daily screening of items entered into the licensee's corrective action program. This assessment was accomplished by reviewing the daily Callaway Plant action request screening report and control room logs and attending selected Callaway Plant action request board and work control meetings. The inspectors: (1) verified that equipment, human performance, and program issues were being identified by the licensee at an appropriate threshold and that the issues were entered into the corrective action program; (2) verified that corrective actions were commensurate with the significance of the issue; and (3) identified conditions that might warrant additional follow-up through other baseline inspection procedures.

b. Findings

No findings of significance were identified.

.2 Selected Issue Follow-up Inspection

a. Inspection Scope

In addition to the routine review, the inspectors selected the below listed issues for a more in-depth review. The inspectors considered the following during the review of AmerenUE's actions: (1) complete and accurate identification of the problem in a timely manner; (2) evaluation and disposition of operability/reportability issues; (3) consideration of extent of condition, generic implications, common cause, and previous occurrences; (4) classification and prioritization of the resolution of the problem; (5) identification of root and contributing causes of the problem; (6) identification of corrective actions; and (7) completion of corrective actions in a timely manner.

- January 31, 2007, Callaway Action Request 200700893, Failure to Report Property Sale in Accordance with 10 CFR 50.83
- January 19, 2007, Callaway Action Request 200700517, Volume Control Tank Level Decrease During Boron Thermal Regeneration System Resin Flush
- March 9, 2007, Callaway Action Request 200702011, Downpower Required Due to Sodium Excursion in the Intermediate Pressure Condenser Hotwell

- March 14, 2007, Callaway Action Request 200702384, Essential Service Water Piping Leak
- March 22, 2007, Callaway Action Request 200702685, Volume Control Tank Level Decrease During Chemical and Volume Control System Resin Flush

Documents reviewed by the inspectors included:

- Procedure APA-ZZ-00500, Appendix 17, Screening Process Guidelines, Revision 0
- Piping and Instrumentation Diagram M-22BG02, Chemical and Volume Control System, Revision 25

The inspectors completed three in-depth reviews and two operator work around samples.

b. Findings

(1) Inadequate Management of an Operator Workaround Resulted in Unplanned Loss of Volume Control Tank Inventory

Introduction. The inspectors identified a Green finding after volume control tank inventory was inadvertently diverted from the reactor coolant system on January 19 and March 22, 2007, due to inadequate management of an operator workaround.

Description. On January 19 and March 22, 2007, volume control tank inventory was inadvertently diverted from the reactor coolant system during demineralizer operations. On both occasions operators had isolated the volume control tank from the demineralizer during resin transfer operations. However, volume control tank inventory was lost due to leakage past closed demineralizer isolation valves. Degraded Grinnell diaphragm valves have been a longstanding Callaway Plant material condition problem. Incorrect mechanical stop settings have repeatedly resulted in leakage past the valve seats. Plant operations did not track nor effectively work around the degraded demineralizer valves.

A previous volume control tank transient occurred on March 6, 2001, due to leakage past degraded Grinnell diaphragm valves (described in CAR 200100869). Corrective action included adding a caution to Procedure RTS-HC-00310, "Primary Resin change out/Sample of CVCS BTRS Demin D Bulk Waste Disposal Station, Revision 0 to state that the valves leaked. This corrective action was inadequate to prevent recurrence of two VCT level transients in 2006. Both of the 2006 transients involved operators inappropriately using caution cards to work around the degraded diaphragm valve (described as NRC Finding FIN 05000483/2006004-02, Inadequate Equipment Control Procedure Resulted in Loss of Volume Control Tank Inventory) also caused by leakage past degraded Grinnell diaphragm valves. The inspectors also identified a previous example of the licensee's less than adequate operator workaround of known equipment problems (described as NRC Finding NCV 05000483/2006005-05, Inadequate

Evaluation of an Operator Workaround Resulted in an Inoperable Safety Injection Accumulator).

Analysis. This finding affected the initiating events cornerstone because the unplanned loss of volume control tank inventory was a transient initiator precursor. The failure of plant operators to adequately work around the degraded demineralizer isolation valves is a performance deficiency. This finding is greater than minor because the failure to adequately manage operator workarounds could reasonably be viewed as a precursor to a significant event. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the inspectors determined that this finding is only of very low significance because the condition did not result in the reactor coolant system technical specification leakage limit being exceeded, did not contribute to both the likelihood of a reactor trip and the likelihood that mitigating equipment or functions would be unavailable, and did not increase the likelihood of a fire or internal/external flood. This finding has a crosscutting aspect in the area of human performance associated with the work control component because AmerenUE did not plan work activities to support long-term equipment reliability by limiting operator workarounds.

Enforcement. No violation of regulatory requirements occurred. The inspectors determined that this finding did not represent a noncompliance because it did not involve a safety-related component or technical specification required procedure. The licensee entered this finding into their corrective action program as Callaway Action Request 200700517 (FIN 05000483/2007002-02, Inadequate Management of an Operator Workaround Resulted in Unplanned Loss of Volume Control Tank Inventory).

(2) Inadequate Corrective Actions to Preserve Essential Service Water System Material Condition

Introduction. The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criteria XVI, after past corrective actions were inadequate to preclude recurrence of essential service water piping degradation due to corrosion.

Description. On March 14, 2007, plant personnel identified a through-wall leak in the Train B large bore essential service water piping. The through-wall leak was downstream of the pump discharge check valve. Plant operators declared the essential service water train inoperable. The inoperable train resulted in elevated plant risk and required implementation of risk management actions. Non-destructive examination identified a 2-inch by 3-inch oval area with less than minimum wall thickness at the location of the through-wall leak. AmerenUE dispositioned the through-wall leak using the guidance provided in Regulatory Issue Summary 2005-20 and returned the essential service water train to service on March 17, 2007. On March 23, 2007, plant personnel identified a second through-wall leak in the Train B large bore essential service water piping. Operations department personnel again declared the train inoperable, resulting in elevated plant risk and risk management actions. AmerenUE dispositioned the degraded pipe using the guidance provided in Regulatory Issue Summary 2005-20 and returned the essential service water train to service on March 24, 2007.

In March 2007, plant technicians performed non-destructive examinations on about 10 percent of the accessible large bore piping. Technicians identified 93 indications of less than minimum pipe wall thickness. The licensee concluded the pipe degradation resulted from microbiologically influenced corrosion. AmerenUE dispositioned each case of below minimum wall thickness using the guidance provided in Regulatory Issue Summary 2005-20.

Poor material condition of the essential service water system has been a longstanding problem at the Callaway Plant. On March 23, 2005, plant personnel identified an essential service water through-wall leak in large bore piping downstream of the Train B pump discharge check valve. This condition was identified as a significant condition adverse to quality. Nondestructive examination revealed a 12-inch by 5-inch pipe section below minimum required wall thickness. A technical specification required shutdown was needed before AmerenUE completed repairs (as described in Licensee Event Report 2005-002, "Plant Shutdown Required by Technical Specification for an Inoperable Essential Service Water Train," and Callaway Action Request 200501838). The licensee concluded the pipe degradation was caused by under-deposit corrosion exacerbated by microbiologically influenced corrosion. The licensee event report documented 11 additional microbiologically influenced corrosion-related essential service water through-wall leaks that had occurred during the 3 years prior to the shutdown. The licensee's extent of condition review was not adequate to identify the degraded piping which resulted in the March 14 and 23, 2007, through-wall leaks.

On January 25, 2006 (Callaway Action Request 200600553), plant operators again declared Train B of the essential service water system inoperable due to a through-wall pipe leak. This through-wall leak was also caused by microbiologically influenced corrosion. This condition was identified as a significant condition adverse to quality. The licensee concluded that inadequate corrective actions following the 2005 through-wall leaks was one of the root causes of the event. The licensee's corrective action plan included an action to perform non-destructive examination of 26 additional locations to assess the extent of essential service water pipe wall thinning. However, only three of these examinations were completed before the March 14, 2007, through-wall leak was identified. The remainder were postponed until the next outage. The location of the March 14 through-wall leak was near one of the locations that the licensee had postponed for examination. The licensee's extent of condition review following the January 25, 2006, through-wall leak was not adequate to identify the degraded piping that resulted in the March 14 and 23, 2007, through-wall leaks.

Analysis. The failure to complete an adequate extent of condition review of essential service water system corrosion issues and to implement prescribed corrective actions were performance deficiencies. This finding is greater than minor because it is associated with the reactor safety mitigating systems cornerstone and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, this finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating

events. This finding has a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because AmerenUE did not fully evaluate essential service water corrosion issues to ensure that the resolutions adequately addressed the causes and extent of condition needed to ensure nuclear safety.

Enforcement. Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion XVI, "Corrective Actions," required AmerenUE to establish measures to assure that conditions adverse to quality, such as defective equipment, deficiencies, and deviations are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall ensure that the cause of the condition is determined and corrective action is taken to preclude repetition. Contrary to the above, AmerenUE failed to take adequate measures to assure that the cause of a significant condition adverse to quality, essential service water corrosion, was determined and corrective action was taken to preclude repetition following the 2005 and 2006 through-wall leaks. Because this finding is of very low safety significance and was entered into the licensee's corrective action program (Callaway Action Request 200702724), this violation is being treated as a noncited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000483/2007002-03, Inadequate Corrective Actions to Preserve Essential Service Water System Material Condition.

4OA6 Management Meetings

Exit Meeting Summary

On March 29, 2007, the resident inspectors presented the results of their inspection to Mr. T. E. Hermann, Vice President Engineering, and other members of his staff who acknowledged the findings.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

T. Antweiler, Construction Supervisor, Nuclear Engineering Technical Support Reliability Group
K. Bruckerhoff, Supervisor, Emergency Preparedness
F. Diya, Director, Plant Operations
R. Farnam, Radiation Protection Manager
A. Heflin, Vice President
K. Mills, Supervising Engineer, Regional Regulatory Affairs/Safety Analysis
D. Neterer, Manager, Operations

LIST OF ITEMS OPENED AND CLOSED

Opened and Closed

05000483/2007002-01	NCV	Inoperable Auxiliary Feedwater Pump due to an Inadequate Surveillance Procedure (Section 1R22)
05000483/2007002-02	FIN	Inadequate Management of an Operator Workaround Resulted in Unplanned Loss of Volume Control Tank Inventory (Section 4OA2)
05000483/2007002-03	NCV	Inadequate Corrective Actions to Preserve Essential Service Water System Material Condition (Section 4OA2)

DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Drawings

Piping and Instrumentation Diagram M-22EN01, Containment Spray System
Piping and Instrumentation Diagram M-22EJ01, Residual Heat Removal System

Procedures

OSP-AL-00001, Auxiliary Feedwater Flow Paths Valve Alignment, Revision 7
OTN-EJ-00001, Residual Heat Removal System, Revision 20
OTN-AL-00001, Auxiliary Feedwater System Revision 19
OTN-EN-00001, Containment Spray System, Revision 10

Section 1R15: Operability Evaluations

Requests for Resolution

RFR 5728C, Compliance with Bulletin 88-04 for auxiliary feedwater pumps, December 18, 2003
RFR 5728B, Compliance with Bulletin 88-04 for BG, EJ, EM systems, March 27, 2003

Procedures

OTO-SB-00069, SB069 Contingency Monitoring Actions, Revision 6

Drawings

7243D59, S042, Solid State Protection System Interconnection Diagram, Revision 6

M-767-00329, Functional Trips, Revision 0

E-23KJ01A, Schematic Diesel Generator, Revision 1

Drawing E-23KJ03A, Schematic Diesel Generator, Revision 13

E-23NE10, Schematic Diesel Generator Feeder Breaker, Revision 11

Piping and Instrumentation Diagram Auxiliary Feedwater System M-22AL01

Piping and Instrumentation Diagram Emergency Service Water System M-U2EF01, Revision 55

M-UC0111(Q), ESW Pumphouse Piping Plan, Revision 30

Drawing M-23EF01(Q), Piping Isometric Essential Service Water Control Building (A&B) Train, Revision 18

Miscellaneous

Instruction Manual for Solid State Protection System, M-767-00310, Revision 12

Section 1R22: Surveillance Testing

Procedures

ESP-ZZ-00010, At-Power Moderator Temperature Coefficient Measurement, Revision 19

OSP-EJ-P001B, Train B Residual Heat Removal Inservice Test - Group A, Revision 38

OSP-AL-P00B, Motor-Driven Auxiliary Feedwater Pump B Inservice Test, Revision 40

OSP-ZZ-00001, Control Room Shift and Daily Log Readings and Channel Checks, Revision 52

OSP-BB-00009, Reactor Coolant System Inventory Balance, Revision 13

Calculations

Number 06-136, Containment Cooler Thermal Performance Test Data Evaluation and Uncertainty Analysis, Revision 0