UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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ARLINGTON, TEXAS 76011-4005

August 7, 2006

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 05000483/2006003

Dear Mr. Naslund:

On June 23, 2006, the NRC completed an inspection at your Callaway Plant. The enclosed report documents the inspection findings which were discussed on June 26, 2006, with Mr. T. 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 five 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 four of these issues. These violations are being treated as noncited violations (NCVs), consistent with Section VI.A of the Enforcement Policy. The NCVs are described in the subject inspection report. If you contest these violations or the significance of these NCVs, 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).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

/RA/

William B. Jones, Chief
Project Branch B
Division of Reactor Projects

Docket: 50-483
License: NPF-30

Enclosure:
NRC Inspection Report
05000483/2006003
w/attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	50-483
License:	NPF-30
Report No.:	05000483/2006003
Licensee:	Union Electric Company
Facility:	Callaway Plant
Location:	Junction Highway CC and Highway O Fulton, Missouri
Dates:	March 25 through June 23, 2006
Inspectors:	M. S. Peck, Senior Resident Inspector D. E. Dumbacher, Resident Inspector R. E. Lantz, Senior Emergency Preparedness Inspector D. L. Livermore, Reactor Inspector B. K. Tharakan, Health Physicist
Approved By:	W. B. Jones, Chief, Project Branch B

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SUMMARY OF FINDINGS

IR 05000483/2006003; 03/25 - 6/23/2006; Callaway Plant: Heat Sink Performance, Operator Performance During Nonroutine Evolutions and Events and Operability Evaluations.

This report covered a 3-month inspection by region based emergency preparedness, reactor and health physics inspectors, and resident inspectors. Four Green noncited violations, and a Green finding were identified. The significance of most findings is indicated by their color (Green, White, Yellow, and 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 for overseeing the safe operation of commercial nuclear power reactors is described in NUREG 1649, Reactor Oversight Process, Revision 3, dated July 2000.

A. Inspector-Identified and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. A self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," was identified after a water hammer transient occurred because plant operators failed to follow a procedure. On May 31, 2006, a main steam line water hammer occurred after plant operators failed to properly align the main steam drains prior to initializing a reactor coolant system heat up. Plant operators had failed to return the drain valves to service following main turbine repairs. This issue was entered into the corrective action program as Callaway Action Request 200604255.

  This finding is greater than minor because this finding is associated with the initiating events cornerstone configuration control attribute for equipment lineup in that it challenged one main steam line and the associated components upstream of the main steam isolation valves. The inspectors used the at-power significance determination process because plant operators had secured the residual heat removal pump at the time of the event. This finding is of very low safety significance because the condition was not a loss of coolant accident initiator, did not contribute to the likelihood of a reactor trip or the likelihood that mitigating systems would be unavailable, and did not increase the likelihood of fire or flooding. This finding had a crosscutting aspect in the area of human performance because plant operators failed to follow established procedures (Section 1R14).

Cornerstone: Mitigating Systems

- Green. A self-revealing finding was identified after an inadequate switchyard maintenance procedure resulted in the loss of power to a safety-related bus. On June 6, 2006, off-site power was lost to a plant safety-related bus when electricians restored the "breaker failure" relay for a main switchyard breaker. The emergency diesel generator automatically started and restored power to the bus. The inspectors identified AmerenUE did not use applicable operational experience prior to conducting the work. NRC Information Notice 1991-81, "Switchyard Problems that Contribute to Loss of Offsite Power," and an AmerenUE operational experience, "Lessons Learned

Switchyard Activity Checklist," addressed similar conditions. This issue was entered into the corrective action program as Callaway Action Request 200604492.

This finding is greater than minor because the availability and reliability of a safety-related 4 kV bus was challenged. This finding was associated with the equipment performance attribute of the mitigating systems cornerstone and affected the objective to ensure availability and reliability of systems that respond to initiating events to prevent undesirable consequences. The inspectors determined this finding to be of very low safety significance because the condition was not a design or qualification deficiency per Part 9900, Technical Guidance, Operability Determination Process, did not result in a loss of safety function for a single train for greater than its Technical Specification allowed outage time, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding had a crosscutting aspect in the area of human performance because personnel did not have adequate procedures and work instructions for switchyard work (Section 1R14).

Cornerstone: Barrier Integrity

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," after containment heat exchanger postmodification tests, conducted in Refuel Outages 11 (May 2001) and 12 (November 2002), failed to demonstrate that the system would perform satisfactorily in service. The inspectors identified that postmodification tests did not meet an acceptance criteria, testing was not performed under appropriate conditions, test methods did not meet industry standards, and tests did not establish acceptance criteria. This issue was entered into the corrective action program as Callaway Action Requests 200509450, 200600012, and 200605143.

  This finding is greater than minor because it affects the barrier integrity cornerstone and if left uncorrected, this finding could become a more significant safety concern by impacting the ability to assess that the containment coolers will perform satisfactorily for containment pressure control. The inspectors used the "Containment Integrity Significance Determination Process," Manual Chapter 0609, Appendix H, guidance because this finding involved an actual reduction in defense-in-depth for the atmospheric pressure control of containment. The inspectors determined that this finding was Type B because the integrity of containment was affected without increasing the likelihood of core damage. The finding was of very low safety significance because the containment heat exchanger only impacted late containment failure and source terms, but not large early release frequency (Section 1R07).

- Green. The inspectors identified a noncited violation of Technical Specification 3.6.6, "Containment Spray and Cooling Systems," after AmerenUE failed to perform Surveillance Requirement 3.6.6.7 to verify minimum cooling water was provided to each containment cooling train between October 23, 2002, and June 26, 2006. Technical Specification Bases, Figure 3.6.6.7-1, "Containment Cooler Heat Removal Minimum Cooling Flow Rates," provided an "acceptable region" for reduced service water flow as a function of the available fraction of rated heat exchanger heat removal capacity. The "acceptable region" ensured sufficient duty to remove the required containment heat

loads during accident conditions. AmerenUE had not performed adequate testing to determine the containment heat exchanger available percent of rated capacity. This issue was entered into the corrective action program as Callaway Action Request 200605143.

This finding is greater than minor because if left uncorrected, this finding could become a more significant safety concern involving containment pressure control during certain design basis accidents. This finding affected the barrier integrity cornerstone for the heat removal capability of the containment cooling system. The inspectors used the "Containment Integrity Significance Determination Process," Manual Chapter 0609, Appendix H, because this finding involved an actual reduction in defense in depth for the atmospheric pressure control of the containment. The inspectors determined that this finding was Type B because the integrity of the containment was affected without increasing the likelihood of core damage. The inspectors concluded this finding was of very low safety significance because the containment heat exchanger only impacted late containment failure and source terms but not large early release frequency. This finding had a crosscutting aspect in the area of problem identification and resolution because AmerenUE did not adequately evaluate containment heat exchanger problems such that the causes and extent of condition were properly classified, prioritized, and evaluated for operability and reportability (Section 1R07).

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," after AmerenUE failed to properly evaluate a degraded containment cooling train. The inspectors identified that between August 16 and September 17, 2005, the performance data for Containment Cooler Train A did not demonstrate that the cooler was capable of performing the required design bases function because of fouling. AmerenUE performed an inadequate evaluation before placing the degraded heat exchanger in service for an 18-month fuel cycle beginning June 12, 2004. This issue was entered into the corrective action program as Callaway Action Request 200600012.

  This finding is greater than minor because it affected the barrier integrity cornerstone for the heat removal capability of the containment cooling system and if left uncorrected, this finding could become a more significant safety concern because significant degradation of the containment cooler was not predicted or detected prior to the end of the operating cycle. The inspectors used the "Containment Integrity Significance Determination Process," Manual Chapter 0609, Appendix H, because this finding involved an actual reduction in defense in depth for the atmospheric pressure control of the containment. The inspectors determined that this finding was Type B because the integrity of the containment was affected without increasing the likelihood of core damage. The inspectors concluded this finding was of very low safety significance because the containment cooler heat exchanger only impacted late containment failure and source terms but not large early release frequency. This finding had a crosscutting aspect in the area of problem identification and resolution because AmerenUE did not adequately evaluate operability of a degraded containment heat exchanger such that the resolutions addressed causes and extent of condition, as necessary (Section 1R15).

Cornerstone: Miscellaneous

B. Licensee-Identified Violations

Violations of very low significance, which were identified by AmerenUE, have been reviewed by the inspectors. Corrective actions taken or planned by AmerenUE have been entered into AmerenUE's corrective action program. These violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

The Callaway Plant was operating at full power during the beginning of the inspection period. On May 12, 2006, an unplanned manual reactor trip occurred from 10 percent power. Plant operators tripped the reactor after losing steam generator water level control. AmerenUE restarted and synchronized the plant to the grid later on the same day. Following restart, plant operations personnel were not able to increase turbine generator output to greater than 90 percent. AmerenUE shutdown the plant on May 17 to troubleshoot and repair the main turbine. AmerenUE completed turbine repairs and restarted the reactor on June 4. AmerenUE operated the plant at full power for the remainder of the inspection period.

1. REACTOR SAFETY
Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment (71111.04)

Partial Walkdowns

a. Inspection Scope

The inspectors: (1) walked down portions of three 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 Final Safety Analysis Report (FSAR) and corrective action program to ensure problems were being identified and corrected.

- April 18, 2006, Essential service water (ESW), Train A
- May 9, 2006, Residual heat removal (RHR), Train A
- June 13, 2006, Component cooling water (CCW) system, Train A

The inspectors completed three samples

Documents reviewed by the inspectors are listed in the attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

Quarterly Inspection

The inspectors walked down the 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.

- March 27, 2006, Fire Area C-15, North battery and switchboard room
- March 27, 2006, Fire Area C-16, South battery and switchboard room
- March 28, 2006, Fire Area U-104, ESW pumphouse, Train A
- March 28, 2006, Fire Area U-105, ESW pumphouse, Train B
- March 30, 2006, Fire Area A-27, Reactor trip switchgear area
- April 20, 2006, Fire Area C-21, Lower cable spreading room
- April 20, 2006, Fire Area C-27, Control room
- May 9, 2006, Fire Area A-1, Auxiliary building

The inspectors completed eight samples.

Documents reviewed by the inspectors are listed in the attachment

Annual Inspection

On June 12, 2006, the inspectors observed a fire drill in Room 3801, upper cable spreading room. The inspectors evaluated the readiness of licensee personnel to prevent and fight fires, including the following aspects: (1) the number of personnel assigned to the fire brigade, (2) use of protective clothing, (3) use of breathing apparatuses, (4) use of fire procedures and declarations of emergency action levels, (5) command of the fire brigade, (6) implementation of pre-fire strategies and briefs, (7) access routes to the fire and the timeliness of the fire brigade response, (8) establishment of communications, (9) effectiveness of radio communications, (10) placement and use of fire hoses, (11) entry into the fire area, (12) use of fire fighting equipment, (13) searches for fire victims and fire propagation, (14) smoke removal, (15) use of prefire plans, (16) adherence to the drill scenario, (17) performance of the postdrill critique, and (18) restoration from the fire drill.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

The inspectors reviewed AmerenUE programs, verified performance tests against industry standards, and reviewed critical operating parameters and maintenance records for the containment heat exchangers. The inspectors verified that: (1) performance tests were satisfactorily conducted for heat exchangers/heat sinks and reviewed for problems or errors; (2) AmerenUE utilized the periodic maintenance method outlined in Electric Power Research Institute NP-7552, "Heat Exchanger Performance Monitoring Guidelines;" (3) AmerenUE properly utilized biofouling controls; (4) AmerenUE's heat exchanger inspections adequately assessed the state of cleanliness of their tubes; and (5) the containment cooling system was correctly categorized under the maintenance rule.

The inspectors completed one sample.

Documents reviewed by the inspectors are listed in the attachment.

b. Findings

1. Less Than Adequate Evaluation of Containment Heat Exchanger Postmodification Tests Results and Self-Assessment Recommendations

Introduction: The inspectors identified a Green noncited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion XI, after AmerenUE failed to perform adequate postmodification testing of the containment heat exchangers. The inspectors identified examples of postmodification tests that did not meet the established acceptance criteria, where acceptance criteria was not established, where testing was not performed under appropriate conditions, and test methods did not meet industry standards. In addition to the findings discussed in this section, the inspectors addressed a concern with the adequacy of TS required testing in Item 2 of this section.

Description: The inspectors identified that AmerenUE had not adequately demonstrated, through performance, flow and differential pressure testing, that the containment heat exchangers would perform acceptably following installation. The Callaway Plant has two containment heat exchangers in each containment cooling train. Each train is required to remove 141 x 10^6 British thermal units per hour (BTU/hr) under accident conditions. AmerenUE performed containment heat exchanger replacements during Refuel Outages 11 and 12. Each new containment heat exchanger consisted of 12 parallel coils, 8 coils arranged across one service water supply header, and 4 coils across a second header (Figure 1). The postmodification testing requirements, established by Testing Requirements Determination Record 00-1018, Revision A, included:

- Containment Cooler Performance Test Train A/B, Procedure ETP-GN-0001A/B
- ESW Train A/B Flow Verification, Procedure ETP-EF-0002A/B
- ESW Train A/B Inservice Test, Procedure OSP-EF-P001A/B

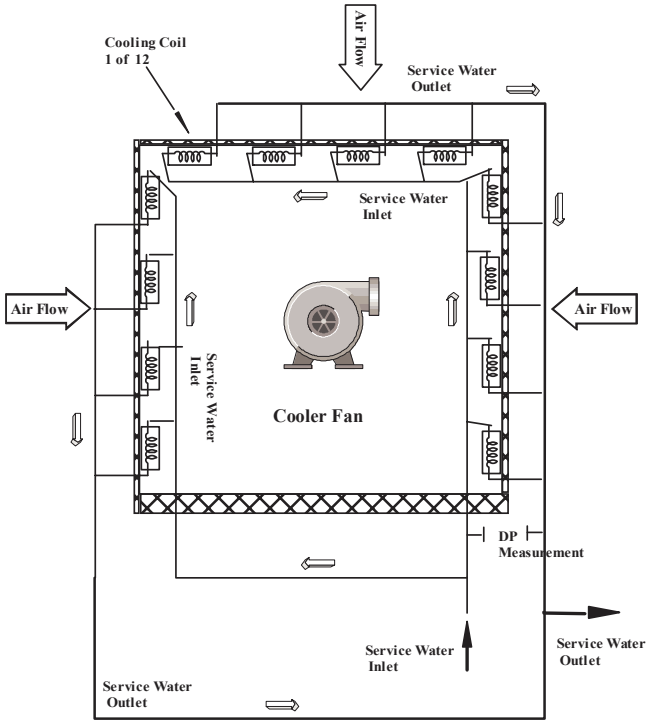

Figure 1
Containment Heat Exchanger

The performance test used the Temperature Effectiveness Method to verify that the new containment heat exchangers were capable of removing the required postaccident heat load. The flow verification test used the Differential Pressure Method to verify the service water tube side was free of flow obstructions. The in-service test verified minimum service water flow was available for each containment heat exchanger. The inspectors identified that the performance test acceptance criteria was not met for two containment heat exchangers. Procedures ETP-GN-0001A and B established a minimum of 80 percent heat transfer effectiveness. The inspectors identified that the test conditions for the other two containment heat exchanger performance tests were not appropriate. In both cases the air leaving the containment heat exchangers was warmer than the air entering the containment heat exchangers. The absence of a heat load across the containment heat exchangers invalidated the test results. AmerenUE

entered the failure to meet acceptance criteria and inadequate test conditions in the corrective action program as Callaway Action Request (CAR) 200605143.

Electric Power Research Institute Guideline NP-7552 established the testing methodology and requirements for the Temperature Effectiveness Method. Guideline NP-7552 required that the flow conditions during the test be within ± 5 percent of the accident flow conditions. The inspectors identified that AmerenUE performed all four performance tests with the heat exchanger fans passing 140,000 SCFM (standard cubic feet per minute) on the fin side. The fans are expected to operate at 67,000 SCFM during accident conditions. The inspectors also identified that service water flow on the tube side during each test was significantly less than the expected ESW accident flow rates. The inspectors concluded that the postmodification tests failed to demonstrate any of the four heat exchangers were capable of removing the required heat loads. AmerenUE entered the failure to perform the test under appropriate conditions in the corrective action program as CAR 200509450.

The inspectors identified that AmerenUE failed to establish acceptance criteria for the flow verification test. The flow verification test used the Differential Pressure Method to verify no tube side flow obstructions existed for the new heat exchangers. Plant engineers measured the pressure drop across the header that supplied 8 of the 12 coils. Figure 1 indicates the location where AmerenUE measured differential pressure. The measurement was performed at the same static head on all four new containment heat exchangers. The pressure drop test results, corrected for flow variances, ranged from 20 pounds per square inch differential (psid) to 31.4 psid. The expected value from the manufacturer was 14.5 psid. AmerenUE did not perform an evaluation to address why the test results varied between the newly installed coils or from the manufacturer's expected value. The inspectors identified that AmerenUE did not include differential pressure acceptance criteria into the postmodification test. AmerenUE entered the failures to perform an evaluation of the flow verification test results and provide test acceptance criteria into the corrective action program as CAR 200600012.

Tables 1 through 4 provide a summary of the postmodification test results for each containment heat exchanger.

Table 1
Containment Heat Exchanger A Postmodification Testing

Postmodification Testing	Reference	Comments
Performance Test	P692756	150% Effectiveness. Inappropriate test conditions, the outlet air was at a higher temperature than inlet. Test was performed at 140,000 cubic feet per minute (CFM) and without a heat load.
Differential Pressure	P649209	31.4 psid at 2,000 gallons per minute (gpm), no acceptance criteria documented.
Flow Verification	S67503	Met acceptance criteria but did not address variance between coolers.

Table 2
Containment Heat Exchanger B Postmodification Testing

Postmodification Testing	Reference	Comments
Performance Test	P692484	91% Effectiveness. Inappropriate test conditions, the outlet air was at a higher temperature than inlet. Test was performed at 140,000 CFM and without a heat load.
Differential Pressure	P676141	21.2 psid at 2,000 gpm no acceptance criteria documented.
Flow Verification	S674688	Met acceptance criteria but did not address variance between coolers.

Table 3
Containment Heat Exchanger C Postmodification Testing

Postmodification Testing	Reference	Comments
Performance Test	P661633	76% Effectiveness. Failed acceptance criteria of 80%. Test was performed at 140,000 CFM.
Differential Pressure	P676150	29 psid at 2,000 gpm no acceptance criteria documented.
Flow Verification	S701018	Met acceptance criteria but did not address variance between coolers.

Table 4
Containment Heat Exchanger D Postmodification Testing

Postmodification Testing	Reference	Comments
Performance Test	P660650	70% Effectiveness. Failed acceptance criteria of 80%. Test was performed at 140,000 CFM.
Differential Pressure	P676141	20 psid at 2,000 gpm no acceptance criteria documented.
Flow Verification	S700792	Met acceptance criteria but did not address variance between coolers.

The inspectors noted that AmerenUE had past opportunities to address the inadequate containment heat exchanger postmodification test acceptance criteria. Self-Assessment Report SA01-NE-014, "ESW Equipment Performance and Material Condition," dated November 16, 2001, identified that the postmodification test did not include flow/differential pressure acceptance limits from the heat exchanger manufacturer. The report stated that "plant personal had no way of knowing what the actual flow differential pressure performance characteristics of these heat exchangers should be other than what the original heat exchangers were specified to be." The report stated that "no documented bases could be located to support the acceptance criteria which is significantly higher than original design and that the acceptance criteria should have been based on the original maximum acceptance pressure drop through the coils."

AmerenUE requested and received design differential pressure data from the manufacturer on May 14, 2003. AmerenUE did not use this vendor supplied data to reevaluate the postmodification test results.

Analysis: The performance deficiency associated with this finding involved the failure of AmerenUE to perform an adequate postmodification test of the containment heat exchangers and resolve acceptance test discrepancies. This finding is greater than minor because if left uncorrected, this finding could become a more significant safety concern by impacting the ability to assess that the containment coolers will perform satisfactorily for containment pressure control. This finding affects the heat removal capability of the containment cooling system. The inspectors used the "Containment Integrity Significance Determination Process," Manual Chapter 0609, Appendix H, guidance because this finding involved an actual reduction in defense in depth for the atmospheric pressure control of containment and is associated with the barrier integrity cornerstone. The inspectors determined that this finding was Type B because the integrity of containment was affected without increasing the likelihood of core damage. The inspectors concluded this finding was of very low safety significance because the containment heat exchanger only impacted late containment failure and source terms, but not large early release frequency.

Enforcement: Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion XI, "Test Control," required that testing demonstrates that systems will perform satisfactorily in service, is performed in accordance with test procedures which incorporate the requirements and acceptance limits contained in applicable design documents, is performed under suitable environmental conditions, and that test results are evaluated to assure that test requirements have been satisfied. Contrary to the above, postmodification testing performed during Refuel Outages 11 and 12 did not demonstrate that containment heat exchangers would perform satisfactorily in service, was not performed in accordance with test procedures which incorporate the requirements and acceptance limits contained in applicable design documents, was not performed under suitable environmental conditions, and did not evaluate the test results to ensure that test requirements had been satisfied. Because of the very low safety significance and AmerenUE's action to place this issue in their corrective action program as CARs 200509450, 200600012, and 200605143, this violation is being treated as an NCV in accordance with Section VI.A.1 of the Enforcement Policy (NCV 05000483/2006003-01).

2. Less Than Adequate Evaluation of Containment Heat Exchanger Performance Monitoring Requirements

Introduction: The inspectors identified a Green noncited violation of TS 3.6.6, "Containment Spray and Cooling Systems," after AmerenUE failed to perform SR 3.6.6.7 to verify minimum cooling water was provided to each containment cooling train. As described in Item 1 of this section of the report, AmerenUE has invoked TS Surveillance Requirement 3.0.3 to allow testing of the containment coolers within the period allowed by the Surveillance.

Description: The inspectors identified that AmerenUE had not verified that minimum cooling water was provided to each containment cooling train as required by SR 3.6.6.7. TS 3.6.6 originally required 4,000 gpm service water flow to each containment heat exchanger train. This requirement was relocated to the TS bases per Facility Operating Licensee Amendment 133 (May 28, 1999, prior to the containment cooler replacements). Because of tube side fouling, AmerenUE had difficulty maintaining the minimum 4,000 gpm to each heat exchanger. AmerenUE reduced the minimum flow requirement by developing a relationship between actual (measured) containment heat exchanger duty and cooling water flow in Calculation ZZ-485, ADD 1, Revision 0, June 5, 2000, "Development of TS bases for Containment Heat Exchanger Acceptance Criteria." Calculation ZZ-485 maintained post-accident heat removal requirements by compensating for time dependant heat exchanger performance degradation, primarily because of macro and micro fouling, by increasing essential service water flow. From this calculation, AmerenUE developed TS Bases, Figure SR 3.6.6.7-1, "Containment Cooler Heat Removal Minimum Cooling Flow Rates." Figure 3.6.6.7-1 provided an "acceptable region" for reduced service water flow as a function of the percent of rated heat exchanger heat removal capacity. The "acceptable region" ensured sufficient duty to remove the 141 x 10^6 BTU/hr required during accident conditions. SR 3.6.6.7 required verification of the minimum corresponding service water flow each 18 months. The safety evaluation accompanying TS Bases Change Form CN 00-026, which added TS Bases, Figure 3.6.6.7-1, and dropped the 4,000 gpm flow requirement, stated that systems engineering must be able to determine the actual heat exchanger thermal performance in order to determine acceptable cooling water flow.

AmerenUE used the Differential Pressure Method to periodically assess containment heat exchanger performance. The Differential Pressure Method monitors changes in the pressure drop across the tube side of the heat exchanger. This method calculates a corresponding reduction in available heat transfer area lost to macro fouling. Each refueling outage, plant engineers measured the differential pressure across 8 of the 12 coils in each containment heat exchanger (Figure 1). Plant engineering scheduled heat exchanger cleaning based on increasing differential pressure. Electric Power Research Institute Guideline NP-7552, Section 4.2, stated that the Differential Pressure Method will not directly provide a value of the thermal resistance associated with fouling, which is necessary for determining heat transfer capability. Electric Power Research Institute TR-107397, "Service Water Heat Exchanger Testing Guidelines," Section 2.5.1, stated that the Differential Pressure Method is not considered a heat transfer test and cannot be used alone to quantitatively determine the thermal performance of a heat exchanger. AmerenUE entered the failure to perform TS SR 3.6.6.7 in the corrective action program as CAR 200605143.

AmerenUE committed, by letter, "Response to Generic Letter 89-13, Service Water System Problems Affecting Safety Related Equipment," January 29, 1990, to verify the heat transfer capability of all safety-related heat exchangers cooled by essential service water. In addition, AmerenUE committed to trend and compare the containment heat exchanger heat removal rates to the design requirements to promote identification of degraded cooling equipment. The inspectors identified that AmerenUE did not

implement this commitment for the containment heat exchangers. AmerenUE entered the failure to implement their commitment to Generic Letter 89-13 in the corrective action program as CAR 200604274.

AmerenUE formed a task team to review these concerns (CAR 200600012) in January 2006. The task team's failure to thoroughly evaluate containment heat exchanger problems was a recent missed opportunity to correct the misapplication of TS Bases, Figure 3.6.6.7-1. AmerenUE has invoked TS Surveillance Requirement (SR) 3.0.3 for containment cooler testing. In accordance with the requirements of TS SR 3.0.3, AmerenUE has established that there is a reasonable assurance that the containment coolers remain capable of performing their safety function. The licensee's bases included adequate essential service water flow rate is available, measured differential pressure values indicate low macrofouling, and low micro fouling values have been measured on other comparable open water heat exchangers.

Analysis: The performance deficiency associated with this finding involved the failure of AmerenUE to perform adequate evaluation of containment heat exchanger thermal performance testing, as required by TS SR 3.6.6.7 and its commitment to the NRC in response to Generic Letter 89-13. This finding is greater than minor because if left uncorrected, this finding could become a more significant safety concern involving the heat removal capability of the containment cooling system. The inspectors used the "Containment Integrity Significance Determination Process," Manual Chapter 0609, Appendix H, because this finding involved an actual reduction in defense in depth for the atmospheric pressure control of the containment and is associated with the barrier integrity cornerstone because the required containment cooler surveillance testing was not performed to assure the coolers' performance capabilities. The inspectors determined that this finding was Type B because the integrity of the containment was affected without increasing the likelihood of core damage. The inspectors concluded this finding was of very low safety significance because the containment heat exchanger only impacted late containment failure and source terms but not large early release frequency. This finding had a crosscutting aspect in the area of problem identification and resolution because AmerenUE did not adequately evaluate containment heat exchanger testing to ensure the requirements of TS 3.6.6.7 were met.
Enforcement: TS 3.6.6, Limiting Conditions for Operations (LCOs), required two containment cooling trains to be operable in Mode 1. TS SR 3.0.1 stated that the failure to perform a surveillance within the specified frequency shall be a failure to meet the LCOs. TS SR 3.6.6.7 required AmerenUE to verify that each containment cooling train established minimum cooling water flow every 18 months. Contrary to the above, AmerenUE did not verify each containment cooling train established minimum cooling water flow between October 23, 2002, and June 26, 2006. Because of the very low safety significance and AmerenUE's action to place this issue in their corrective action program as CARs 200604274 and 200605143, this violation is being treated as an NCV in accordance with Section VI.A.1 of the Enforcement Policy (NCV 05000483/2006003-02).

1R11 Licensed Operator Requalification Program (71111.11Q)

Quarterly Inspections

a. Inspection Scope

The inspectors observed testing and training of senior reactor operators and reactor operators to identify deficiencies and discrepancies in the training, to assess operator performance, and to assess the evaluator's critique. The inspectors observed licensed operator continuing training simulator training Scenario FR S.1 0603 SIM conducted on June 22, 2006. The scenario involved a failure of the reactor to trip and a steam generator tube leak.

The inspectors completed one sample.

Documents reviewed by the inspectors are listed in the attachment.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q)

a. Inspection Scope

The inspectors reviewed the two listed maintenance activities to: (1) verify the appropriate handling of structures, systems, and components (SSCs) performance or condition problems; (2) verify the appropriate handling of degraded SSCs functional performance; (3) evaluate the role of work practices and common cause problems; and (4) evaluate the handling of SSC issues reviewed under the requirements of the maintenance rule, 10 CFR Part 50, Appendix B, and the TSs.

- June 12, 2006, CAR 200602066, Thermal overload and breaker trips on charging pump room heat exchanger, Train B
- June 12, 2006, CARs 200601898 and 200601924, Control building **ventilation system** dampers failed to close

The inspectors completed two samples.

Documents reviewed by the inspectors are listed in the attachment.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

Risk Assessment and Management of Risk

The inspectors reviewed the four 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 AmerenUE recognizes, and/or enters as applicable, the appropriate licensee-established risk category according to the risk assessment results and licensee procedures; and (4) AmerenUE identified and corrected problems related to maintenance risk assessments.

- March 28, 2006, Component cooling water, Train A, planned outage. The inspectors observed risk management activities from the control room and completed an in-office review of the risk assessment.

- April 4, 2006, Emergency diesel generator (EDG), Train A, planned outage. The inspectors verified implementation of the compensatory measures from the control room and completed an in-office review of the risk assessment.

- April 18, 2006, ESW, Train B, planned outage. The inspectors verified implementation of the compensatory measures from the control room and auxiliary building and completed an in-office review of the risk assessment.

- May 2, 2006, Risk evaluation of ESW, emergency cooling tower, Train A, maintenance outage. The inspectors observed risk management activities from the control room and completed an in-office review of the risk assessment.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed four samples.

Emergent Work Control

The inspectors: (1) verified that AmerenUE performed actions to minimize the probability of initiating events and maintained the functional capability of mitigating systems and barrier integrity systems; (2) verified that emergent work-related activities such as troubleshooting, work planning/scheduling, establishing plant conditions, aligning equipment, tagging, temporary modifications, and equipment restoration did not place the plant in an unacceptable configuration; and (3) reviewed the Final Safety Analysis Report to determine if AmerenUE identified and corrected risk assessment and emergent work control problems.

- April 12, 2006, Probabilistic Risk Assessment Evaluation Request 06-268 and CAR 200602911, risk assessment of missed surveillance (SR 3.3.4.2), auxiliary shutdown panel transfer switches

- May 17, EDG, Train B, failed postmaintenance test (PMT). The inspectors verified implementation of the compensatory measures from the control room.

- June 8, 2006, Partial loss of off-site power due to degraded breaker failure relay on Breaker MDV85. The inspectors verified implementation of the postactuation risk measures from the control room.

The inspectors completed three samples.

Documents reviewed by the inspectors are listed in the attachment.

b. Findings

No findings of significance were identified.

1R14 Operator Performance During Nonroutine Evolutions and Events (71111.14)

a. Inspection Scope

The inspectors: (1) reviewed operator logs, plant computer data, and/or strip charts for the below listed evolutions to evaluate operator performance in coping with nonroutine events and transients; (2) verified that operator actions were in accordance with the response required by plant procedures and training; (3) attended and/or reviewed postevent critic meetings; and (4) verified that AmerenUE identified and implemented appropriate corrective actions associated with any human performance problems that occurred during the nonroutine evolutions sampled.

- March 29, 2006, Cooling tower blowdown pipe leak and tritium sampling, CAR 200602491

- April 3, 2006, Operations personnel not able to meet FSAR assumed establishment of cold leg recirculation emergency core cooling system mode, CAR 200602565

- May 12, 2006, Turbine trip and reactor trip on P-14 high steam generator level, CAR 200603734

- May 31, 2006, Main steam line steam flashing event (CAR 200604255)

- June 6, 2006, Operations personnel response to loss of switchyard Bus B and 4 kV essential Bus NB01, CAR 200604492.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed five samples.

b. Findings

.1 Failure to Follow Procedures Resulted in a Main Steam Line Water Hammer

Introduction: A self-revealing Green noncited violation of TS 5.4.1.a, "Procedures," was identified after the failure of plant operators to follow procedures resulted in a main steam line water hammer during a reactor coolant system heat up.

Description: On May 31, 2006, a main steam line water hammer occurred after plant operators failed to properly align the main steam drains prior to initializing a reactor coolant system heat up. Plant operators had failed to return the drain valves to service following maintenance to support main turbine repairs. Procedure OTG-ZZ-00001, "Plant Heatup Cold Shutdown to Hot Standby," Revision 48, required the secondary plant be available prior to reactor coolant system heat up. Procedure OTG-ZZ-00001 stated that the shift manager and control room supervisor had responsibility to ensure that any system not specifically addressed was available, or in service, as conditions dictated.

Contributing to this event was a change to Procedure OTN-AB-00001, "Main Steam and Steam Dump Systems." The previous revision of Procedure OTN-AB-00001 (Revision 14), Step 4.3.3, required the operator to specifically verify that main steam line drain Valves ABLV0007, 8, 9, and 10 were open and drain flow had been established. The inspectors noted that AmerenUE deleted the requirement to verify drain flow was established in the last revision (Revision 15). Removal of this verification step contributed to the failure of operations personnel to recognize that the drains were out of service prior to the heat up.

Analysis: The performance deficiency associated with this finding involved the failure of plant operations personnel to follow plant procedures during a reactor coolant system heat up. This finding affected the initiating events cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions. This finding is greater than minor because this finding is associated with the initiating events cornerstone configuration control attribute. The inspectors determined this finding to be of very low safety significance (Green) using the significance determination process for at-power reactor situations. The inspectors used the at-power significance determination process because plant operators had secured the RHR pump at the time of the event. This finding is of very low safety significance because the condition was not a loss of coolant accident initiator, did not contribute to the likelihood of a reactor trip or the likelihood that mitigating systems would be unavailable, and did not increase the likelihood of fire or flooding. This finding is similar to Example 4.b in Manual Chapter 0612, Appendix E. This finding had a crosscutting aspect in the area of human performance because plant operators failed to follow established procedures.

Enforcement: TS 5.4.1.a, "Procedures," required written procedures be implemented covering the activities specified in Appendix A, "Typical Procedures for Pressurized Water Reactors," of Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," February 1978. Regulatory Guide 1.33, Appendix A, Section 2A, required general plant operating procedures for cold shutdown to hot standby to be implemented correctly. Procedure OTG-ZZ-00001, was used to operate the plant from hot shutdown to hot standby. Procedure OTG-ZZ-00001 required the secondary plant to be available prior to reactor heat up. Contrary to the above, on May 31, 2006, AmerenUE operators did not ensure the secondary plant was available prior to reactor coolant system heat up. Because of the very low safety significance and AmerenUE's action to place this issue in their corrective action program as CAR 200604255, this violation is being treated as an NCV in accordance with Section VI.A.1 of the Enforcement Policy (NCV 05000483/2006003-03).

.2 Review of Operator Response to Main Turbine High Vibration and Manual Reactor Trip

Introduction: The inspectors are reviewing the operator actions and plant response that resulted in an unplanned reactor trip.

Description: On May 12, 2006, plant operators manually tripped the reactor after a reactivity transient led to a feedwater isolation. Prior to the event, AmerenUE was reducing power to less than 50 percent to support replacement of a reactor coolant system flow transmitter. At approximately 48 percent power, plant operators tripped the main turbine after observing high vibration. Plant operators entered Procedure OTO-AC-00001, "Turbine Trip Below P-9." Reactor power was driven to about 12 percent over the next 4 minutes by automatic rod control. A high steam generator level feedwater isolation occurred after plant operators opened three of the four feedwater bypass valves. The operators opened the bypass valves in an attempt to transfer feedwater control from the main feedwater regulation valves. The operator manually tripped the reactor following the feedwater isolation.

The inspectors are reviewing the operators implementation of Procedure OTO-AC-00001 to assess the adequacy of the procedure and the operators actions. Procedure OTO-AC-00001 provided steps to stabilize reactor power following a main turbine trip and establish feedwater flow using the bypass regulating valves. Procedure OTO-AC-00001, Step 10 directed plant operators to transfer feedwater control to the bypass valves before reaching 20 percent power. Operations personnel did not perform Step 10 until reactor power was reduced to about 12 percent. Procedure OTO-AC-00001, Step A1, required steam generator levels to be trending between 45 and 55 percent prior to opening the feedwater bypass valves. The purpose of Step A1 was to drive the automatic main feedwater regulation valves closed using a slight increase in steam generator level. Operations personnel opened the bypass valve when steam generator levels were greater than 80 percent and trending up. The main feedwater regulating valves were already closed in response to high stream generator levels. The high steam generator level feedwater isolation (91 percent level) occurred less than a minute after the operator opened the bypass valves.

This issue is considered unresolved pending additional inspector review of Procedure OTO-AC-00001 to assess the adequacy of the procedure and the operators actions (Unresolved Item 05000483/2006004-04).

.3 An Inadequate Switchyard Restoration Procedure Resulted in a Partial Loss of Off-Site Power

Introduction: A self-revealing Green finding was identified after an inadequate AmerenUE switchyard maintenance work instruction resulted in the loss of a switchyard bus and a plant safety-related 4 kV bus.

Description: On June 6, 2006, off-site power was lost to a plant 4 kV safety-related bus when electricians restored the "breaker failure" relay for a main switchyard breaker. A contact had failed closed on the relay. The closed contact made up the logic for the secondary supervisory circuit and extended the trip signal to each adjacent breaker on the line, resulting in the loss of power to switchyard Bus B. The loss of the switchyard bus de-energized the "protected train," 4 kV Bus A. The emergency diesel generator automatically started and supplied power to the Train A bus. The maintenance restoration procedure had directed the electricians verify the primary supervisory circuit had an "open" trip logic prior to restoring the backup function of the relay. The secondary supervisory trip logic was not an open circuit when the relay test isolation switch was restored.

The inspectors identified AmerenUE did not use applicable Operational Experience (OE) in developing the work instruction prior to conducting the work. NRC Information Notice 1991-81, "Switchyard Problems that Contribute to Loss of Offsite Power," and AmerenUE OE "Lessons Learned," and a Switchyard Activity Checklist addressed similar conditions. Use of the OE may have prevented the event. One unused checklist item addressed assessing potential plant risk prior to the maintenance. AmerenUE had not recognized that failures associated with switchyard Bus B could challenge the protected train of emergency power. The inspectors identified that failure to use this OE resulted in a missed opportunity to identify risks and methods that could prevent inadvertent equipment actuations.

Analysis: The performance deficiency associated with this finding involved an inadequate restoration procedure and the failure of AmerenUE to consider potential risk consequences prior to authorizing switchyard work. This finding is greater than minor because the availability and reliability of a safety-related 4 kV bus was challenged. This finding was associated with the equipment performance attribute of the mitigating systems cornerstone and affected the objective to ensure availability and reliability of systems that respond to initiating events to prevent undesirable consequences. The inspectors determined this finding to be of very low safety significance (Green) using the significance determination process for at power situations. Using the NRC Inspection Manual Chapter 0609, Phase 1 Screening Worksheet, this finding was determined to be of very low safety significance since the condition was not a design or qualification deficiency per Part 9900, Technical Guidance, Operability Determination Process, did not result in a loss of safety function for a single train for greater than its TS allowed outage time, and did not screen as potentially risk significant due to a seismic, flooding,

or severe weather initiating event. This finding had a crosscutting aspect in the area of human performance because personnel did not have adequate procedures and work instructions for switchyard relays to ensure that the breaker failure relay would not create an inadvertent actuation.

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 or TS required procedure. AmerenUE entered this finding into their corrective action program as CAR 200604492 (FIN 05000483/2006003-05).

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 evaluation was warranted for degraded components; (2) referred to the FSAR and design basis documents to review the technical adequacy of licensee operability evaluations; (3) evaluated compensatory measures associated with operability determinations (OD); (4) determined degraded component impact on any TSs; (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.

- OD 200602565, March 31, 2006, CCW flow requirements not met
- OD 200408232, April 25, 2006, Fire protection header flow requirements not met
- OD 200603324, May 2, 2006, Nonconservative TS surveillance limits would result in emergency core cooling pump requirements not being met
- OD 200603504, May 4, 2006, Degraded ESW containment isolation Valve EFHV0031
- OD 200603737, May 12, 2006, Loss of responsiveness of auxiliary feedwater level control Valve ALHV0007 during manual operation.
- OD 200604009, May 22, 2006, Degraded main feedwater isolation solenoid valve
- OD 200604242, June 4, 2006, Exposed wiring on Barton pressure transmitters
- OD 200507805, October 5, 2005, Degraded containment Heat Exchanger SGN01A tube inspection findings and NRC Unresolved Item 05000483/2005005-03.

- OD 200500238, January 24, 2005 Degraded main steam isolation valve (MSIV) and NRC Unresolved Item 05000483/2005002-05

The inspectors completed nine samples.

Documents reviewed by the inspectors are listed in the attachment.

b. Findings

1. Less than adequate OD of a Degraded Containment Heat Exchanger

Introduction: The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, after AmerenUE failed to properly evaluate a degraded containment cooling train.

Description: The inspectors identified that, between August 16 and September 17, 2005, Containment Cooler, Train A, was not capable of performing the required design bases function because of fouling. FSAR, Section 6.2.1.3, "Mass and Energy Release Analyses for Postulated Loss-of-Coolant Accidents," and Section 6.2.1.4, "Mass and Energy Release Analysis for Postulated Secondary Pipe Ruptures Inside Containment," stated that each containment cooling train was required to remove 141 x 10^6 BTU/hr, at 277EF. The Callaway Plant has two containment cooling trains. Containment cooling Train A consists of Heat Exchangers A and C.

AmerenUE inspected containment Heat Exchanger A during Refueling Outage 14. CAR 200507805 stated that several tube banks were blocked up to 30 percent with Asiatic clams, rust nodules, mud, and some plastic. AmerenUE concluded that the blockage did not present a past operability concern. The engineer concluded no other operability evaluation was required based on successful differential pressure testing completed May 20, 2004, during the previous refueling outage (Refueling Outage 13). AmerenUE used the Differential Pressure Method to periodically assess containment heat exchanger performance. The Differential Pressure Method monitors changes in the pressure drop across the tube side of the heat exchanger. The method uses a calculation to determine a corresponding reduction in available heat transfer area lost to macro fouling. Each refueling outage, plant engineers measured the differential pressure across 8 of the 12 coils in each containment heat exchanger (Figure 1, Section 1R07). The engineers used Calculations GN-03, "Determine the Minimum ESW Flow Rate to the GN Coolers," and EF-45, "Acceptance Criteria Used in Essential Service Water Flow Balance Procedures," to establish a containment heat exchanger train operability indicator (TOI). The TOI reflected the reduced service water side heat transfer area due to increased differential pressure. While differential pressure could be used to estimate degradation due to macro fouling, the method does not provide a correlation to thermal performance.

AmerenUE determined Train A's TOI was 0.382 during Refueling Outage 13 based on 43.2 psid across Heat Exchanger A and 19 psid across Heat Exchanger C. Based on

measured TOI greater than the TOI acceptance criteria (0.372), AmerenUE concluded Containment Cooling Train A, was operable and scheduled cleaning during the next refueling outage.

The inspectors reviewed past operability of the degraded containment cooling train. Because AmerenUE did not perform any as-found testing prior to cleaning, the inspectors used operating containment heat exchanger thermal data to assess the degradation due to fouling. The inspectors selected 25 sets of hourly heat exchanger process fluid and air temperature data points from the plant computer on August 16, 2005. The inspectors used the Thermal Performance Method provided in EPRI TR-107397 and EPRI NP-7552 to calculate the tube side fouling. The inspectors validated the methodology by successfully predicting the design tube side fouling factor. The inspectors used the following inputs in the assessment:

- ESW flow rates were taken from Procedure ETP-EF-002A, "ESW, Train A Flow Verification (P676150)," performed May 10, 2004 (1,581 gpm and 2,200 gpm, containment Heat Exchangers A and C).

- ESW flow available to the containment heat exchangers during accident conditions was reduced by 6 percent due to auxiliary feedwater flow demand (CAR 200001186).

- The containment heat exchangers operated in noncondensing mode on August 16, 2005.

- The containment heat exchangers would operate in condensing mode during accident conditions.

- Tube side fouling was independent of heat exchanger operating mode.

- Accident condition heat removal capability was based on Calculation NESE 1081, "Aerofin Containment Cooler Performance Data," March 14, 2001, sensitivity study which compared condensing mode duty degradation as a function of service water flow and increasing tube side fouling

The inspectors concluded containment Heat Exchanger A had a fouling of 0.0055 containment Heat Exchanger C fouling of 0.0040 on August 16, 2005. This fouling corresponded to a total available Containment Cooling Train A duty of 120 x 10^6 BTU/hr under accident conditions. The inspectors concluded that the containment cooling train was inoperable because the fouling reduced the available duty below the 141 x 10^6 BTU/hr needed to satisfy the accident analysis. The inspection concluded that the containment cooling train remained inoperable until the plant was shutdown on September 17, 2005, because tube side fouling would not have improved until cleaning.

The inspectors also evaluated past cooler train operability using the Differential Pressure Method. While differential pressure does not provide a conclusion of thermal performance, AmerenUE used the method to determine when heat exchanger cleaning was required. Because AmerenUE did not perform any as-found differential pressure

testing prior to cleaning, the inspectors trended past test results to predict the differential pressure at end of Cycle 14. The inspectors applied the method provided in American Society of Mechanical Engineers OM-S/G Part 21, "Inservice Testing of Heat exchangers in Light Water Reactor Plants," to trend past testing data. The inspectors concluded that differential pressures of 54.2 psid and 27.4 psid (Heat Exchanger A and Heat Exchanger C) would have been expected at the end of Cycle 14. These differential pressures correspond to a predicted TOI of 0.327. A TOI of 0.327 was less than the 0.372 TOI acceptance criteria established during Refuel 13. The inspectors concluded that AmerenUE should have determined that Containment Cooling train A would not have remained operable through Cycle 14 and should have been cleaned prior to startup after Refuel Outage 13.

Analysis: The performance deficiency associated with this finding involved the failure of AmerenUE to perform an adequate operability evaluation of a degraded containment heat exchanger train. This finding is greater than minor because, if left uncorrected, this finding could become a more significant safety concern because fouling had occurred that resulted in greater degradation than expected. This finding affected the heat removal capability of a containment cooler train. The inspectors used the "Containment Integrity Significance Determination Process," Manual Chapter 0609, Appendix H, because this finding involved an actual reduction in defense-in-depth for the atmospheric pressure control of the containment and is associated with the barrier integrity cornerstone. The inspectors determined that this finding was Type B because the integrity of the containment was affected without increasing the likelihood of core damage. The inspectors concluded this finding was of very low safety significance because the containment cooler heat exchanger only impacted late containment failure and source terms but not large early release frequency. This finding had a crosscutting aspect in the area of problem identification and resolution because AmerenUE did not adequately evaluate the containment coolers to ensure they remained operable for the operating cycle, including their operability during Refueling Outage 14.

Enforcement: Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion XVI, required measures be established to assure that conditions adverse to quality, such as defective equipment, are promptly identified and corrected. Contrary to the above, between August 16 and September 17, 2005, AmerenUE did not promptly identify and correct an inoperable containment cooling train. Because this finding is of very low safety significance and was entered into AmerenUE's CAR 200600012, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000483/2006003-06).

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors selected the six listed activities on 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.

- April 5, PMTs 05110105/930 and 05105805/900, EDG, Train A, following preventive and corrective maintenance of engine electrical components. The inspectors completed an in-office review of the completed PMT.

- April 25, PMT for Jobs P683271, 04500804, and 04502222, 9 year overall of Breaker MDV43. The inspectors completed an in-office review of the completed PMT.

- May 17, EDG, Train B, following failed relay. The inspectors observed the test from the control room and the EDG building and completed an in-office review of the completed PMT.

- May 28, Safety Injection Pump A, flow interaction with containment spray, Train B. The inspectors observed the test from the auxiliary building and completed an in-office review of the completed PMT.

- May 28, PMT 05108988, Ultimate heat sink cooling tower repair. The inspectors completed an in-office review of the completed PMT.

- June 9, PMT for Job 05507314/904, Service air compressor ESW cooling check valve leakage test on Valve EFV0076. The inspectors completed in-office review of the completed PMT.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed six samples.

b. Findings

No findings of significance were identified

1R20 Refueling and Outage Activities (71111.20)

a. Inspection Scope

The inspectors evaluated licensee activities during two separate forced outages beginning May 12 and 17, 2006. The inspectors conducted the review to verify that AmerenUE appropriately considered shutdown risk in developing outage schedules, adhered to administrative risk reduction methodologies to control plant configuration,

developed mitigation strategies for losses of key safety functions, and adhered to the operating license and TS requirements that ensured defense-in-depth. The inspectors observed portions of plant startups and outage control of equipment.

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 TSs to ensure that the six listed surveillance activities demonstrated that the SSCs 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 TS 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 SSCs 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.

- April 4, 2006, Job 06519382, RHR, Train A, pump mini flow recirculation control valve. The inspectors completed an in-office review of the completed test.

- April 13, 2006, Environmental sampling. The inspectors observed the collection of plant environmental samples following tritium concerns.

- April 27, 2006, Environmental core soil samples. The inspectors observed the collection of plant environmental samples following tritium concerns.

- May 10, 2006, Jobs 06520614/500 and 06520577, RHR, Train B. The inspectors completed an in-office review of the completed test.

- May 12, 2006, Jobs 06520938, 06520939, and 06520940, Containment spray, Train B. The inspectors completed an in-office review of the completed test.

- May 29, 2006, Jobs 06116515/500 and 05516993/520, and CAR 200602911, Auxiliary shutdown panel verification test. The inspectors completed an in-office review of the completed test.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed six samples.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert Notification System Testing

a. Inspection Scope

The inspectors discussed with licensee staff the status of offsite siren and tone alert radio systems and licensee changes to the siren testing methodology to determine the adequacy of licensee methods for testing the alert and notification system in accordance with 10 CFR Part 50, Appendix E. AmerenUE's alert and notification system testing program was compared with criteria in NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Revision 1, Federal Emergency Management Agency (FEMA) Report REP-10, Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants, and AmerenUE's current FEMA approved alert and notification system design report.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1EP3 Emergency Response Organization Augmentation Testing

a. Inspection Scope

The inspectors reviewed the following documents related to the emergency response organization augmentation system to determine AmerenUE's ability to staff emergency response facilities in accordance with AmerenUE emergency plan and the requirements of 10 CFR Part 50, Appendix E:

- EIP-ZZ-00200, Augmentation of the emergency organization, Revision 11
- KOA-ZZ-00200, Activation of the Callaway plant emergency callout system, Revision 9
- Evaluations for call-in and drive-in drills conducted in 2005 and 2006

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

a. Inspection Scope

The inspectors performed in-office reviews of Revision 37 to Emergency Plan Implementing Procedure EIP-ZZ-00101, Classification of Emergencies, received in February 2006.

This revision restored the Revision 32 bases description of conditions for a fire, which require declaration of an Alert. Revision 33 had been determined to be a decrease in the effectiveness of the emergency plan as documented in NRC Inspection Report 05000483/2005005.

The revision was compared to its previous revision, to the criteria of NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Revision 1, to criteria of Nuclear Energy Institute 99-01, Methodology for Development of Emergency Action Levels, Revision 2, and to the requirements of 10 CFR 50.47(b) and 50.54(q), to determine if AmerenUE adequately implemented 10 CFR 50.54(q).

This review was not documented in a safety evaluation report and did not constitute approval of licensee changes, therefore, these changes are subject to future inspection.

The inspectors completed one sample during this inspection.

b. Findings

No findings of significance were identified.

1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies

a. Inspection Scope
The inspectors reviewed the following documents related to AmerenUE's CAR to determine AmerenUE's ability to identify and correct problems in accordance with 10 CFR 50.47(b)(14) and 10 CFR Part 50, Appendix E:

- Summaries of all corrective actions assigned to the emergency preparedness department during calendar years 2005 and 2006

- Details of 35 selected action requests

- Procedure APA-ZZ-00500, Corrective Action Program, Revision 40
- Four quality assurance audits and assessments
- Six full scale drill and exercise reports

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01)

a. Inspection Scope

This area was inspected to assess AmerenUE's performance in implementing physical and administrative controls for airborne radioactivity areas, radiation areas, high radiation areas, and worker adherence to these controls. The inspectors used the requirements in 10 CFR Part 20, the TSs, and AmerenUE's procedures required by TSs as criteria for determining compliance. During the inspection, the inspectors interviewed the radiation protection manager, radiation protection supervisors, and radiation workers. The inspectors performed independent radiation dose rate measurements and reviewed the following items:

- PI events and associated documentation packages reported by AmerenUE in the occupational radiation safety cornerstone
- Controls (surveys, posting, and barricades) of three radiation, high radiation, or airborne radioactivity areas
- Radiation work permits, procedures, engineering controls, and air sampler locations
- Self-assessments, audits, licensee event reports, and special reports related to the access control program since the last inspection
- Corrective action documents related to access controls
- Radiation worker and radiation protection technician performance with respect to radiation protection work requirements

The inspectors completed 8 of the required 21 samples.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02)

a. Inspection Scope

The inspector assessed licensee performance with respect to maintaining individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspector used the requirements in 10 CFR Part 20 and AmerenUE's procedures required by TSs as criteria for determining compliance. The inspector interviewed licensee personnel and reviewed:

Current 3-year rolling average collective exposure

- Site-specific trends in collective exposures, plant historical data, and source-term measurements
- Site-specific ALARA procedures
- Five work activities of highest exposure significance completed during the last outage.
- ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements
- Intended versus actual work activity doses and the reasons for any inconsistencies
- Post work reviews
- Method for adjusting exposure estimates, or re-planning work, when unexpected changes in scope or emergent work were encountered
- Radiation worker and radiation protection technician performance during work activities in radiation areas and high radiation areas
- Self-assessments, audits, and special reports related to the ALARA program since the last inspection
- Resolution through the corrective action process of problems identified through post work reviews and post outage ALARA report critiques
- Corrective action documents related to the ALARA program and follow-up activities such as initial problem identification, characterization, and tracking

The inspector completed 9 of the required 15 samples and 3 of the optional samples.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 PI Verification (71151)

a. Inspection Scope

The inspectors sampled licensee submittals for the PIs listed below for the period from March 2004 through March 2006. The inspectors used the definitions and guidance contained in Nuclear Energy Institute 99-02, Regulatory Assessment Indicator Guideline, Revision 2, to verify the accuracy of the PI data reported by AmerenUE.

Reactor Safety Cornerstone

- High pressure injection safety system unavailability
- Safety system functional failures

The inspectors reviewed a selection of Licensee Event Reports, portions of operator log entries, daily morning reports, the monthly operating reports, and PI data sheets to determine whether AmerenUE adequately identified the number of unavailable hours for the selected systems. This number was compared to the number reported for the PI during the current quarter. In addition, the inspectors also interviewed licensee personnel associated with PI data collection, evaluation, and distribution.

The inspectors completed two samples.

Occupational Radiation Safety Cornerstone

Occupational Exposure Control Effectiveness Performance Indicators

Licensee records reviewed included corrective action documentation that identified occurrences in high radiation areas with dose rates greater than 1,000 millirem per hour at 30 centimeters (as defined in TSs), very high radiation areas (as defined in 10 CFR 20.1003), and unplanned personnel exposures (as defined in Nuclear Energy Institute 99-02). Additional records reviewed included ALARA records and whole body counts of selected individual exposures. The inspectors interviewed licensee personnel that were accountable for collecting and evaluating the PI data. In addition, the inspector toured plant areas to verify that high radiation and very high radiation areas were properly controlled.

The inspectors completed one sample.

Public Radiation Safety Cornerstone

Radiological Effluent TS/Offsite Dose Calculation Manual Radiological Effluent Occurrences

Licensee records reviewed included corrective action documentation that identified occurrences for liquid or gaseous effluent releases that exceeded PI thresholds and those reported to the NRC. The inspectors interviewed licensee personnel that were accountable for collecting and evaluating the PI data.

The inspectors sampled licensee submittals for the PI listed below for the period of April 1, 2005, through March 31, 2006. The definitions and guidance of Nuclear Engineering Institute 99-02, Regulatory Assessment Indicator Guideline, Revision 3, was used to verify AmerenUE's basis for reporting each data element in order to verify the accuracy of PI data reported during the assessment period. Licensee PI data was also reviewed against the requirements of Procedures RRA-ZZ-00001, NRC Performance Indicator Program, Revision 1, and KDP-ZZ-02000, NRC Performance Indicator Data Collection, Revision 3.

The inspectors completed one sample.

Emergency Preparedness Cornerstone:

- Drill and Exercise Performance
- Emergency Response Organization Participation
- Alert and Notification System Reliability

The inspectors reviewed a 100 percent sample of drill and exercise scenarios and licensed operator simulator training sessions, notification forms, and attendance and critique records associated with training sessions, drills, and exercises conducted during the verification period. The inspectors reviewed selected emergency responder qualification, training, and drill participation records. The inspectors reviewed alert and notification system testing procedures and a 100 percent sample of siren test records. The inspectors also interviewed licensee personnel responsible for collecting and evaluating PI data.

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 AmerenUE's corrective action program. This assessment was accomplished by reviewing the daily CAR Screening Report, Control Room Logs, and attending selected Corrective Action Review Board and work control meetings. The inspectors: (1) verified that equipment, human performance, and program issues were being identified by AmerenUE 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 issue 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.

- May 12, 2006, CAR 200603734, Unplanned reactor trip due to feedwater isolation

The inspectors completed one sample.

b. Findings

Reactor Posttrip Evaluation

Introduction: The inspectors are reviewing the posttrip review conducted for the May 12, 2006, manual reactor trip.

Description: On May 12, 2006, plant operators manually tripped the reactor during a steam generator level transient. The transient began with a turbine trip from 48 percent

power. Reactor power was driven to about 12 percent over the next 4 minutes by automatic rod control. A high steam generator level feedwater isolation occurred after plant operators opened three of the four feedwater bypass valves. The operator manually tripped the reactor following the feedwater isolation.

Administrative Procedure APA-ZZ-00542, “Event Review,” defined reactor trips as either Condition I or Condition II. Procedure APA-ZZ-00542 allowed the Callaway Emergency Duty Officer to authorize reactor restart without approval of the On-Site Review Committee for Condition II trips. Procedure APA-ZZ-00542 defined a Condition II reactor trip as: when the cause of the trip is “positively known” and will be corrected before restart. An unresolved item was identified for AmerenUE’s posttrip assessment of the cause of the trip and the operator performance (URI 05000483/2006003-07). AmerenUE entered this finding into their corrective action program as CAR 200605766.

.3 Semiannual Trend Review

a. Inspection Scope

The inspectors completed a semiannual trend review of repetitive or closely related issues that were documented in plant trend reports, problem lists, PI, system health reports, QA audit reports, corrective documents, and corrective maintenance documents to identify trends that might indicate the existence of more safety significant issues. The inspectors' review consisted of the 6-month period of January through June 2006. When warranted, some of the samples expanded beyond those dates to fully assess the issue. The inspectors also reviewed items listed in the attachment. The inspectors compared and contrasted their results with the results contained in AmerenUE's quarterly trend reports. Corrective actions associated with a sample of the issues identified in the Callaway Plant Quarterly Performance Analysis Report First Quarter (OQC-06-01, May 20, 2006) were reviewed for adequacy. The inspectors used Procedure APA-ZZ-00500, “Corrective Action Program,” and 10 CFR Part 50, Appendix B, as the bases for acceptability.

1. Licensee-Identified Adverse Trends

There were no findings of significance identified. The inspectors evaluated AmerenUE’s trending methodology and reviewed a licensee identified adverse trend:

- Adverse Trend in Human Performance Errors in the Engineering Department for Second Quarter of 2006.

2. NRC-Identified Adverse Trends

The inspectors identified two new adverse trends, one in poor operator attention to detail and a second associated with engineering technical rigor. The inspectors also addressed a continuing adverse human performance trend.

a. Inspector Identified Examples of less than Adequate Operator Attention to Detail

- February 23, 2006, Operators did not recognize a 20EF pressurizer safety tailpipe temperature difference. The inspectors determined the instruments had not tracked since restart from the last refueling outage (CAR 200601494).

- March 1, 2006, The inspectors identified that the equipment out-of-service log was not updated. As a result, the oncoming operations crew did not recognize that the component cooling, safety injection, and RHR pumps were in pull-to-lock and inoperable (CAR 200601677).

- March 15, 2006, The operating crew failed to recognize a control board status light indicating power was unavailable for a component cooling pump room cooler prior to a start attempt (CAR200602066).

- March 28, 2006, The operating crew failed to recognize a maintenance activity required entry into TS 3.5.2. The inspectors identified that operators did not make a proper equipment out-of-service or a control room log entry (CAR 200602443).

- March 30, 2006, The operating crew did not included the proper licensing bases requirement on an out-of-service fire pump (CAR 200602535).

- May 31, 2006, Operators failed to recognize that main steam drain lines were tagged out of service prior to heat up of the secondary plant. This resulted in a water hammer (NRC NCV 0500483/2006003-03).

- June 15 to June 24, 2006, Operations failed to recognize that the CCW, Train B, room Cooler SGL11B had been removed from service for maintenance. (CAR 200605125).

b. Less than Adequate Engineering Technical Rigor

- The Containment Heat Exchanger Task Force failed to identified inadequate postmodification tests and that the associated TS surveillance requirements had not been met (Section 1R07 and NCV 05000483/2006003-02)

- Inadequate past operability evaluation of a containment heat exchanger as described in Section 1R15 of this report (NCV 05000483/2006003-06)

- Inadequate operability evaluation of a degraded control building air conditioning unit (NCV 05000483/2006002-01)

- Inadequate evaluation of Emergency Plan changes (NCV 05000483/2005005-10)

c. Continued Adverse Trend in Human Performance

The NRC identified an adverse human performance trend in December 2004 (Inspection Report 05000483/2004005). The NRC subsequently identified a substantive crosscutting issue in the area of human performance during the 2004 End-of-Cycle Assessment. The substantive crosscutting issue was based on seven NRC findings specifically related to personnel errors that occurred during 2004 and affected the initiating events, mitigating systems, and barrier integrity cornerstones. The NRC concluded that human performance problems related to procedural adequacy and compliance continued in the 2005 Annual Assessment letter issued on March 2, 2006. The inspectors identified two examples of adverse human performance during the second quarter of 2006.

- The failure to follow procedures resulted in a main steam line water hammer (Section 1R14, NCV 05000483/2006003-03)

- Inadequate Switchyard Restoration Procedure Resulted in a Partial Loss of Off-Site Power (Section 1R14, FIN 05000483/2006003-05)

.4 Emergency Preparedness Annual Sample Review

a. Inspection Scope

The inspectors selected 35 action requests for detailed review. The action requests were reviewed to ensure that the full extent of the issues were identified, an appropriate evaluation was performed, and appropriate corrective actions were specified and prioritized. The inspectors evaluated the action requests against the requirements of Procedure APA-ZZ-00500, “Corrective Action Program,” Revision 40.

b. Findings and Observations

No findings of significance were identified.

.5 Radiation Safety and ALARA

a. Inspection Scope

The inspectors evaluated the effectiveness of AmerenUE’s problem identification and resolution process with respect to the following inspection areas:

- Access Control to Radiologically Significant Areas (Section 2OS1)
- ALARA Planning and Controls (Section 2OS2)

b. Findings and Observations

No findings of significance were identified.

4OA3 Event Followup (71153)

(Closed) LER 05000483/2006-001-00: Pressurizer Power Operated Relief Valve Stroke Time and Other Delays Exceeded Times Assumed in the Cold Overpressure Mitigation System Analyses

On January 13, 2006, AmerenUE identified a violation of TS 3.4.12, "Cold Pressure Mitigation System," after determining the power operated relief valve closed stroke time exceeded the values assumed in the accident analysis. AmerenUE concluded that the power operated relief valve stroke times measured during surveillance testing did not account for all of the delay times credited in the accident analysis. AmerenUE entered this condition into the corrective action program as CAR 200509374. The enforcement aspects of this issue are discussed in Section 4OA7 of this report. This LER is closed.

4OA5 Other Activities

.1 Implementation of Temporary Instruction (TI) 2515/165 - Operational Readiness of Offsite Power and Impact on Plant Risk

a. Inspection Scope

The objective of TI 2515/165, "Operational Readiness of Offsite Power and Impact on Plant Risk," is to gather information to support the assessment of nuclear power plant operational readiness of offsite power systems and impact on plant risk. During this inspection, the inspectors interviewed licensee personnel, reviewed licensee procedures, and gathered information for further evaluation by the Office of Nuclear Reactor Regulation.

b. Findings and Observations

No findings of significance were identified.

.2 (Closed) Unresolved Item 05000483/2005005-03: Review of Containment Cooler Operability

The inspectors previously identified an unresolved item (URI 05000483/2005005-03) related to a degraded containment heat exchanger, the apparent failure of AmerenUE to meet SR 3.6.6.7, and commitment to perform performance testing of the containment heat exchangers in response to Generic Letter 89-13. The inspectors evaluation and findings related to the operability of the degraded containment heat exchanger are discussed in Section 1R15 of this report. The inspectors evaluation and findings related apparent failure of AmerenUE to meet SR 3.6.6.7 and commitment to perform performance testing of the containment heat exchangers are discussed in Section 1R07 of this report. This unresolved item is closed.

4OA6 Management Meetings

Exit Meeting Summary

On April 7, 2006, the health physics inspector presented inspection results to Mr. A. Heflin, Vice President, Nuclear, and other members of the staff, who acknowledged the findings.

On April 10, 2006, the senior emergency preparedness inspector conducted a telephonic exit meeting to present the inspection results to Mr. K. Bruckerhoff, Supervisor, Emergency Planning, who acknowledged the findings.

On May 18, 2006, the senior emergency preparedness inspector presented the results of the emergency preparedness program inspection to Mr. T. Herrmann, Vice President, Engineering, and other members of his staff, who acknowledged the findings.

On June 26, 2006, the resident inspectors presented their inspection results to Mr. T. Hermann, Vice President, Engineering, and other members of his staff who acknowledged the findings.

On August 7, 2006, the resident inspectors presented their inspection results to Mr. K. Young, Manager, Regulatory Affairs, and other members of his staff, who acknowledged the findings.

The inspectors confirmed that proprietary information was not provided or examined during the inspection.

4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by AmerenUE and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as NCVs.

- TS 3.4.12 required the cold overpressure mitigation system be operable in Mode 4 with the reactor coolant system temperature less than or equal to 275 degrees Fahrenheit. Contrary to this, on 25 occurrences between October 23, 2002 and November 13, 2005, the cold overpressure mitigation system was not operable during the required mode. This was identified in AmerenUE's corrective action program as CAR 200509374.

- TS SR 3.3.4.2 required an 18 month surveillance to verify that each auxiliary shutdown panel control circuit and transfer switch is capable of performing its intended function. The intended function of auxiliary shutdown panel transfer Switches RPHIS001, RPHIS002, and RPHIS003 is to electrically isolate the main control room from multiple components required for postfire safe shutdown. Contrary to this, prior to April 11, 2006, AmerenUE identified that the control room isolation function of these three transfer switches had not been verified. AmerenUE performed a risk assessment and exercised SR 3.0.3 to delay

compliance with the requirement to declare the LCO not met and to extend the surveillance frequency by 365 days. This inadequate surveillance was identified in AmerenUE's corrective action program as CAR 200602911.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

B. Bevard, Emergency Response Coordinator
K. Bruckerhoff, Supervisor, Emergency Planning
S. Crawford, Emergency Response Coordinator
L. Dean, Supervisor, Radiation Protection
F. Diya, Manager, Engineering Services
R. Farnam, Manager, Radiation Protection
K. Gilliam, Senior Health Physicist, Radiation Protection
L. Graessle, Superintendent, Protective Services
C. Graham, Consulting Health Physicist, Radiation Protection
A. Heflin, Site Vice President
T. Herrmann, Vice President, Engineering
B. Huhmann, Supervisiong Engineer, Nuclear Engineering Systems, Mechanical
G. Hurla, Supervisor, Radiation Protection
D. Lewis, Emergency Response Coordinator
K. Mills, Supervising Engineer, Regional Regulatory Affairs/Safety Analysis
T. Moser, Manager, Plant Engineering
C. Naslund, Senior Vice President and Chief Nuclear Officer
D. Neterer, Manager, Operations
L. Thibault, Director, Plant Operations
D. Thompson, Senior Health Physicist, Radiation Protection
D. Trokey, Emergency Response Coordinator
K. Young, Manager, Regulatory Affairs

LIST OF ITEMS OPENED AND CLOSED

Opened

05000483/2006003-04	URI	Review Adequacy of Procedure and Operator Response to a Turbine Trip (Section 1R14)
05000483/2006003-07	URI	Adequacy of Post Reactor Trip Evaluation (Section 4OA2)

Closed

05000483/2006-001-00	LER	Pressurizer PORV Stroke Time and Other Delays Exceeded Times Assumed in the Cold Overpressure Mitigation System Analyses (Section 4OA3)
05000483/2005005-03	URI	Review of Containment Cooler Operability (Section 4OA5)

Opened and Closed

05000483/2006003-01	NCV	Less Than Adequate Evaluation of Containment Heat Exchanger Postmodification Tests Results and Self Assessment Recommendations (Section 1R07)
05000483/2006003-02	NCV	Less Than Adequate Problem Evaluation Resulted in the Failure to Perform Containment Heat Exchanger Performance Monitoring (Section 1R07)
05000483/2006003-03	NCV	Failure to Follow Procedures Resulted in a Main Steam Line Water Hammer (Section 1R14)
05000483/2006003-05	FIN	Inadequate Switchyard Restoration Procedure Resulted in a Partial Loss of Off-Site Power (Section 1R14)
05000483/2006003-06	NCV	Less than adequate Operability Determination of a Degraded Containment Heat Exchanger (Section 1R15)

DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Procedures

ETP-EG-ST008, CCW System Flow Verification, Revision 0, Attachments 1 and 2, Engineering Acceptance Flow Values for the CCW System.

OSP-EF-00001, ESW Valve Lineup Verification, Revision 6
OSP-EF-P001A, ESW Train A Inservice Test-Group A, Revision 46
OSP-EF-V001A, ESW Train A Valve Operability, Revision 28
OSP-EJ-00001, RHR Valve Line Up Verification, Revision 14
OSP-EJ-P001A, RHR Train A in Service Test, Revision 37

Drawings

M-22EJ01, Piping and Instrumentation drawing for the RHR

Section 1R05: Fire Protection

Procedures

APA-ZZ-0700, Fire Protection Program, Revision 12
APA-ZZ-0741, Control of Combustible Materials, Revision 18
APA-ZZ-00743, Fire Team Organization and Duties, Revision 19
EIP-ZZ-00226, Fire Response Procedure for Callaway Plant, Revision 11
FPP-ZZ-00004, Control Building and Communications Corridor Prefire Strategies, Revision 13
SDP-KC-00001, Requirements for and Duties of Compensatory Fire Watches, Revision 5

Miscellaneous

Information Notice 97-48, Inadequate or Inappropriate Interim Fire Protection Compensatory Measures

2nd Quarter Drill Number 13679

Section 1R07: Heat Sink Performance

Callaway Action Requests

200001186	200509450	200605143
200402353	200600012	
200503773	200604274	

Drawings

M-22EF02, Essential Service Water System
M-22EF08, Essential Service Water Containment Air Coolers

Procedures

EDP-ZZ-01112, Heat Exchanger Predictive Performance Manual, Revision 11
ETP-EF-0002A, Essential Service Water Train A Flow Verification, Revision 9
ETP-GN-001A, Containment Cooler Performance Test, Train A
OSP-EF-P001A, Containment Cooler, Train A, Data

Miscellaneous

Calculation 2004-01120, Essential Service Water Hydraulic Model, Revision 0

Calculation EF-45 ADD 1, ESW Flow Acceptance Criteria, October 16, 2005

Calculation NESE 1081 ADD1, Aerofin Containment Cooler Performance Data Assuming 33 F or 95 F ESW Water temperature, Modification CMP-001018A, Containment Cooler Replacement March 14, 2001

Calculation ZZ-485 ADD 1, Development of TS bases for containment Cooler Acceptance Criteria, Revision 0, June 5, 2000

EPRI 1007248, Alternative to Thermal Performance Testing and/or Tube Side Inspections of Air-to-Water heat Exchangers, October 2002

EPRI NP-7552 Heat Exchanger Performance Monitoring Guidelines

EPRI, TR-107397, Service Water Heat Exchanger Testing Guidelines, March 1998

Heat Exchanger Inspection Report ETP-ZZ-03001, W236012, SGN01A, September 23, 2005

Report - ETL Testing Laboratories, Order 43922-A, September 23, 1987

Self-Assessment final Report SA01-NE-014, ESW Equipment Performance and Material Condition, November 16, 2001

Standards and Guides for Operation and Maintenance of Nuclear Plower Plants, ASME OM-S/G Part 21 Inservice Performance Testing of Heat Exchangers in Light-Water Reactor Power Plants

Section 1R011: Licensed Operator Requalification Program

Procedure E-3, Steam Generator Tube Rupture, Revision 7
ECA-0.0, Loss of all AC Power, Revision 6
FR S.1, Response to Nuclear Power Generation, Revision 6
OTO-AE-00001, Feedwater System Malfunction, Revision 9
OTO-SF-00001, Rod Control Malfunctions, Revision 9

Section 1R12: Maintenance Effectiveness

Procedure EDP-ZZ-01128, Maintenance Rule Program, Revision 6
Maintenance Rule Program
Maintenance Rule Periodic Assessment for Cycle 14
Risk Significant SSCs Unavailability for Cycle 15, dated April 30, 2006

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedure APA-ZZ-00312, Probabilistic Risk Assessment, Revision 3

Procedure EDP-ZZ-01128, Maintenance Rule Program, Revision 6

Procedure EDP-ZZ-01129, Callaway Plant Risk Assessment, Revision 8

Procedure ODP-ZZ-00001, Operations Department - Code of Conduct, Revision 23

Nuclear Management and Resource Council 93-01, Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Revision 3

Procedure EDP-ZZ-01129, Callaway Plant Risk Assessment, Revision 9

Section 1R14: Operator Performance During Nonroutine Evolutions and Events

Miscellaneous

SP06-02, QA review of crew PREP and control room activities during forced Outage 59
AUCA 06-031, event review team meeting summary; loss of Train A off-site vital power due to relay testing

Job 06114531
NRC Information Notice 1991-081: Switchyard Problems that Contribute to Loss of Offsite Power

SER 10-91, Loss of offsite power due to switchyard testing

SER 6-94, Partial loss of off-site power and reactor scram during installation of 13.8 kV voltage regulators, Revision 1

WPA 64325, Forced outage secondary steam master out of service (main steam drains)

Procedures

OTG-ZZ-00001, Plant Heatup Cold Shutdown to Hot Standby, Revision 48
OTN-AB-00001, Main Steam and Steam Dump Systems, Revision 14
OTN-AB-00001, Main Steam and Steam Dump Systems, Revision 15
OTO-AC-00001, Turbine Trip Below P-9, Revision 9
OTO-NB-00001, Loss of Power to NB01, Revision 12
PDP-ZZ-00009, Surveillance Requirement Tracking Procedure, Revision 17

Section 1R15: Operability Evaluations

Callaway Action Requests

200402353
200507805
200508188
200600012

Procedures

EDP-ZZ-01112, Heat Exchanger Predictive Performance Manual, Revision 11
ETP-EF-0002A, Essential Service Water Train A Flow Verification, Revision 9
ETP-GN-001A, Containment Cooler Performance Test Train A
OSP-EF-P001A, Containment Cooler Train A Data
1R15 Operability Evaluations (71111.15)
Equipment Out-of-service Log, Record Number 13019, April 25, 2006
Fire Protection Impairment Permit, Number 7018, December 5, 2004

Miscellaneous

Calculation 2004-01120, Essential Service Water Hydraulic Model, Revision 0

Calculation EF-45 ADD 1, ESW Flow Acceptance Criteria, October 16, 2005

Calculation NESE 1081 ADD1, Aerofin Containment Cooler Performance Data Assuming 33EF or 95 F ESW Water temperature, Modification CMP-001018A, Containment Cooler Replacement, March 14, 2001

Calculation ZZ-485 ADD 1, Development of TS bases for Containment Cooler Acceptance Criteria, Revision 0, June 5, 2000

EPRI 1007248, Alternative to thermal Performance Testing and/or Tube Side Inspections of Air-to-Water heat Exchangers, October 2002

EPRI NP-7552 Heat Exchanger Performance Monitoring Guidelines

EPRI, TR-107397, Service Water heat Exchanger Testing guidelines, March 1998

Heat Exchanger Inspection Report ETP-ZZ-03001, W236012, SGN01A, September 23, 2005

Reactor Power Plants Report - ETL Testing Laboratories, Order 43922-A, September 23, 1987

Self-Assessment final Report SA01-NE-014, ESW Equipment Performance and Material Condition, November 16, 2001

Standards and Guides for Operation and Maintenance of Nuclear Plower Plants, ASME OM-S/G Part 21 Inservice Performance Testing of Heat Exchangers in Light-Water

Section 1R22: Surveillance Testing

Procedures

OSP-EJ-P001B, RHR Train B Inservice Test - Group A, Revision 37

OSP-EJ-V001A, Train A RHR Valves Inservice Test, Revision 16

OSP-EJ-V001B, RHR Train B, Valve Inservice Test, Revision 18

OSP-RP-0002, Auxiliary Shutdown Panel Controls Test, Revision 13

OSP-RP-0003, Auxiliary Shutdown Panel Controls for the Turbine Driven Auxiliary Feedwater Pump Operability Test, Revision 11

Drawings

Drawing E-23AB01, Schematic Diagram Main Steam Supply Valve to Turbine Driven Auxiliary Feedwater Pump, Revision 8

Drawing E-23SA16, Schematic Diagram Status Panel SOV Position Inputs, Revision 4

Callaway Action Requests

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Audits and Self-Assessments

Quality Assurance Surveillance Report SP06-027, April 2006

Section 1EP2: Alert Notification System Testing

Procedures

EIP-ZZ-00201, Notifications, Revision 42
KSP-ZZ-00001, Alert and Notification Availability, Revision 7
KSP-ZZ-00008, Tone Alert Radios, Revision 3
KSP-ZZ-00103, Quarterly Emergency Communication Test, Revision 0
KSP-ZZ-00110, Siren Alerting System Testing, Revisions 1 and 2

Miscellaneous

Radiological Emergency Response Plan, Revision 27, Change Notice 4
FEMA ANS Design Reports, April 2006 and May 2005

Section 1EP3: Emergency Response Organization Augmentation Testing

Procedures

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KSP-ZZ-00201, Emergency Augmentation Drill/Test, Revision 0
KSP-ZZ-00202, Paging System Weekly Test, Revision 1

Miscellaneous

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Medical Emergency Response Team Drills, November 2004, June 2005
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Section 1EP5: Correction of Emergency Preparedness Weaknesses and Deficiencies

Procedures

EIP-ZZ-00240, Technical Support Center Operations, Revision 35

EIP-ZZ-A0020, Maintaining Emergency Preparedness, Revision 23

EIP-ZZ-A0260, Event Closeout/ Plant Recovery, Revision 13

KDP-ZZ-00400, Emergency Preparedness 10 CFR 50.54(q) Evaluation, Revision 10

KDP-ZZ-00410, Radiological Emergency Response Plan Change Notice Review Process, Revision 9

KDP-ZZ-00510, Exercise Submittals to NRC/FEMA, Revision 2

MSE-UB-NC002, TSC HVAC Flows in Filter Mode, Revision 1

OTN-UB-70001, Technical Support Center, Revision 1

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AP04-013, December 9, 2004
AP05-009, September 6, 2005

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200406246	200503736	200602727
200406920	200505181	200602960
200408336	200505653	200603246
200408713	200505762	200603475
200408715	200505763	200603482
200500060	200505906	200603643
200500592	200509836	200603670
200501022	200600282	200603855
200501104	200601388	200603856
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Miscellaneous

Drawing A-UAT-19, Technical Support Center HVAC Plan, Revision 2

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Section 4OA1: Performance Indicator Verification

Miscellaneous

2006 Emergency Drill Schedule

Drill Reports

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Pre-Exercise Drill #2, April 20, 2005
Graded Exercise, May 4, 2005
Team 3 Drill, June 15, 2005
Team 1 Drill, August 10, 2005

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200509922	200600696	200602712
200509974	200601023	200602765
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200600664	200601918	

Procedures

APA-ZZ-01001, Callaway Plant ALARA Program, Revision 11
EIP-ZZ-A0066, RERP Training Program, Revision 14
EIP-ZZ-00101, Classification of Emergencies, Revision 37
GDP-ZZ-01810, Quality Assurance Assessment Coverage, Revision 29
HDP-ZZ-01100, ALARA Planning and Review, Revision 2
HDP-ZZ-01200, Radiation Work Permits, Revision 6
HTP-ZZ-01104, Hot Spot Trending Program, Revision 4
HTP-ZZ-06001, High Radiation/Very High Radiation Area Access, Revision 23
KDP-ZZ-02001, Drill and Exercise Program, Revision 2
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732000SGT11, Reactor Coolant System Cutting and Welding for Steam Generator Replacement

732000SGT14, Secondary Cutting and Welding (Large Bore) for Steam Generator Replacement

732000SGT16, Structural Modification for Steam Generator Replacement

602620RESIN, Radwaste ALPS System Activities: ALPS Resin Sluice

550101JOBCOV, Radiation Protection Job Coverage in the Reactor Building and Fuel Building 2047

W223703500, Clean and Paint the Reactor Building Incore Tunnel Liner Plate

Section 71152: Identification and Resolution of Problems

Callaway Action Request

200602911

Procedures

APA-ZZ-00500, Corrective Action Program, Revision 40

OSP-RP-00002, Auxiliary Shutdown Panel Controls Test, Revision 13

OSP-RP-00003, Auxiliary Shutdown Panel Controls Test For the Turbine-Driven Auxiliary Feedwater Pump Operability Test, Revision 11

Quality Assurance Audits

AP05-010, October 5, 2005, Problem resolution, adverse trends, OQAM audit requirements/other commitments, review of self-assessments, organization, special nuclear material program, special nuclear material inventory, source control, and software management

PRA Evaluation Request

PRAER Number 06-268, Revision 2, April 13, 2006, T/S SR 3.0.3 Risk Assessment for ASP

Schematic Diagram

E-23AB01 (Q), Main Steam Valve Supply Valve to Turbine Driven Aux Feedwater Pump, Revision 8

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TSTF-IG-06-01, TS Task Force, Implementation Guidance For TSTF-358, Revision 6, Missed Surveillance Requirements

LIST OF ACRONYMS

ALARA	as low as is reasonably achievable
BTU/hr	British thermal units per hour
CAR	Callaway Action Request
CCW	component cooling water
CFM	cubic feet per minute
CFR	*Code of Federal Regulations*
EDG	emergency diesel generator
ESFAS	engineered safety feature actuation system
ESW	essential service water
FEMA	Federal Emergency Management Agency
FSAR	Final Safety Analysis Report
GPM	gallons per minute
LCOs	limiting conditions for operations
MSIV	main steam isolation valve
NCV	noncited violation
OD	operability determinations
OE	operational experience
PI	performance indicator
PMT	postmaintenance test
psid	pounds per square inch differential
RHR	residual heat removal
SCFM	standard cubic feet per minute
SR	surveillance requirement
SSCs	structures, systems, and components
T_{avg}	average reactor coolant system temperature
TOI	train operability indicator
TSs	Technical Specifications