

# Callaway

## 3Q/2010 Plant Inspection Findings

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### Initiating Events

**Significance:**  Jun 23, 2010

Identified By: NRC

Item Type: FIN Finding

#### **Failure to Ensure Completion of Corrective Actions for Degraded Chemical and Volume Control System Valves**

The inspectors identified a finding associated with AmerenUE's failure to take prompt corrective actions for leaking boundary valves in the chemical and volume control system. On April 13, 2010, an attempt to place the train A chemical and volume control system mixed bed in service resulted in leakage past a documented leaking drain valve. The lingering equipment problems resulted in an unplanned 25 gallon per minute loss rate of volume control tank inventory and an emergency action level declaration for excessive reactor coolant system leakage. Later, the declaration was retracted. The licensee placed this issue into the corrective action program as Callaway Action Request 201003146.

This finding is more than minor because it was associated with the reactor safety Initiating Events Cornerstone attribute of configuration control and affected the objective to limit the likelihood of events that upset plant stability. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," the inspectors determined that this finding is of very low significance because the condition did not result in the reactor coolant system technical specification leakage limit being exceeded, did not contribute to both the likelihood of a reactor trip and the likelihood that mitigating equipment or functions would be unavailable, and did not increase the likelihood of a fire or internal/external flood. This finding, which involved inadequate scheduling of corrective action related jobs, has a crosscutting aspect in the area of human performance associated with the work control component because AmerenUE did not appropriately coordinate work activities to address the impact of the work on different job activities [H.3(b)].

Inspection Report# : [2010003](#) (*pdf*)

**Significance:**  Dec 31, 2009

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

#### **Plant Transient Caused by Human Error During Power Range Nuclear Instrument Surveillance**

The inspectors reviewed a self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," after maintenance on power range nuclear instrument N41 resulted in an unanticipated plant transient. On October 6, 2009, the licensee performed Procedure ISL-SE-00N41 to calibrate power range nuclear instrument N41. During performance of the test, control rods unexpectedly inserted ten and a half steps at a rate of 72 steps per minute. The negative reactivity that was inserted due to the inward rod motion caused reactor power to drop approximately one percent power and pressurizer pressure to drop from 2235 psig to approximately 2223 psig. Subsequent review by the licensee determined that the cause of the undesired rod motion was the rod bank selector switch being left in "auto" rather than "other than auto" as required by the procedure. The licensee initiated Callaway Action Request 200908596 to address the causes of the unanticipated plant transient.

This finding was determined to be greater than minor because it impacted the Initiating Events Cornerstone attribute of human performance and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding was determined to be of very low safety significance since it did not affect the technical specification limit for reactor coolant system leakage or mitigation systems safety function, did not contribute to both the likelihood of a reactor trip and mitigation equipment or functions not being available, and did not increase the likelihood of a fire or internal/external flooding. This finding has a crosscutting aspect in the area of human performance associated with the work practices component because the reactor operator who failed to place

the rod bank selector switch into the procedurally required position failed to use human error prevention techniques, such as self- and peer-checking [H.4(a)].

Inspection Report# : [2009005](#) (pdf)

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## Mitigating Systems

**Significance:** SL-IV Sep 23, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Accurately Report a Condition that Could Have Prevented Fulfillment of a Safety Function**

The inspectors identified a Severity Level IV noncited violation of 10 CFR 50.73(a)(2)(v), "Licensee Event Report System," for failure to report simultaneous inoperability of two steam generator atmospheric steam dump valves as a condition that could have prevented fulfillment of a safety function. On February 8, 2010, AmerenUE submitted Licensee Event Report 05000483/2009-005-00 to document that steam generator atmospheric steam dump valve ABPV0002 was out of service longer than allowed by Technical Specification 3.7.4, "Atmospheric Steam Dump Valves (ASDs)." The licensee event report also documented a period where valve ABPV0002 inoperability overlapped the inoperability of steam generator atmospheric steam dump valve ABPV0003. Callaway Final Safety Analysis Report Section 15.6.3.2.2.p. stated that all three intact steam generator atmospheric steam dump valves are credited in the cool down for a steam generator tube rupture. The inspectors determined that the licensee failed to adequately evaluate the reportability of having simultaneous inoperability of two steam generator atmospheric steam dump valves as a safety system functional failure. This issue was entered into the licensee's corrective action program as Callaway Action Request 201006086 and on September 29, 2010, the licensee submitted Licensee Event Report 05000483/2009-005-001 to correct the reporting error.

This finding affects the Mitigating Systems Cornerstone and is greater than minor because the NRC relies on licensees to identify and report conditions or events meeting the criteria specified in the regulations in order to perform its regulatory function. Because this issue affected the NRC's ability to perform its regulatory function, it was evaluated with the traditional enforcement process. Consistent with the guidance in Section IV.A.3 and Supplement I, Paragraph D.4, of the NRC Enforcement Policy, this finding was determined to be a Severity Level IV noncited violation. This finding has no crosscutting aspect as it was strictly associated with a traditional enforcement violation.

Inspection Report# : [2010004](#) (pdf)

**Significance:**  Jun 23, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate Surveillance Procedure to Verify and Maintain Emergency Core Cooling System Operable**

The inspectors identified a noncited violation of Technical Specification 3.5.2, "Emergency Core Cooling Systems." Specifically Technical Specifications Surveillance Requirement 3.5.2.3, "Verify the ECCS piping is full of water," was not being met by licensee Procedure OSP-SA-00003, "Emergency Core Cooling System Flow Path Verification and Venting." On April 22, 2010, the inspectors discovered that the train B residual heat removal system discharge line EJ-024-ECB-10' did not have an accessible high point vent. The line was required by Callaway procedures to be either monitored by venting or tested using an ultrasonic method as described in the procedure's acceptance criteria. Callaway had identified the need to install a vent valve in line EJ-024-ECB-10' per modification MP-08-0016 prior to Refueling Outage 17. The licensee originally scheduled the vent valve installation during Refueling Outage 17, but had inappropriately deferred the maintenance to the next outage in fall 2011. As immediate corrective action, the licensee installed the vent valves in Refueling Outage 17 and placed this issue into the corrective action program as Callaway Action Request 201004078.

This finding is more than minor because it affected the Mitigating Systems Cornerstone procedure quality attribute and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the inspectors determined that this finding is of very low significance because it was only a design or qualification deficiency confirmed not to result in loss of operability. This finding has a crosscutting aspect in the area of human performance associated with the decision making component because the

licensee failed to use conservative assumptions in decision making and did not adopt a requirement to demonstrate that either venting or ultrasonic testing was needed to verify line EJ-024-ECB-10" was full of water [H.1(b)].

Inspection Report# : [2010003](#) (pdf)

**Significance:**  Jun 23, 2010

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

**Failure to Correctly Fabricate Replacement Gasket for Emergency Diesel Generator Train A**

The inspectors identified a self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," after the licensee failed to adequately select suitable replacement gaskets essential to the operation of emergency diesel generator train A. On March 30, 2010, during performance of Procedure OSP-NE-00024A, "Standby Diesel Generator A 24-Hour Run and Hot Restart Test," the emergency diesel generator train A unexpectedly lost speed and tripped after 16.7 hours of operation. Posttrip indications revealed that the diesel generator tripped from a stripped splined shaft in the governor drive housing. The failure of the splined shaft was caused by an improperly cut gasket which did not have the required oil port hole to allow proper lubrication of the drive assembly. The licensee replaced the damaged shaft and placed this issue in their corrective action program as Callaway Action Request 201002675.

This finding was greater than minor because it was associated with the Mitigating Systems Cornerstone attribute of design control and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The resident inspectors performed the initial significance determination for the diesel gasket finding using the NRC Inspection Manual 0609, Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings." The finding screened to a Phase 2 significance determination because it involved the loss of one train of safety related equipment for greater than its technical specification allowed outage time. A Region IV senior reactor analyst performed a Phase 2 significance determination using the pre-solved worksheet from the "Risk Informed Inspection Notebook for Callaway Nuclear Generating Station," Revision 2.01a. The analyst assumed an exposure period of one year. The finding was potentially Yellow, which warranted further review. The senior reactor analyst subsequently performed a bounding Phase 3 significance determination and found the finding to be of very low safety significance (Green). The dominant cutsets included a loss of offsite power initiating event, failure to recover offsite power in 4 hours, failure of the train B emergency diesel generator, and a reactor coolant pump seal failure. Equipment that mitigated the significance included the operable emergency diesel generator and the turbine-driven auxiliary feedwater pump. This finding did not have a crosscutting aspect since it was not a performance deficiency reflective of current licensee performance. Inspection Report# : [2010003](#) (pdf)

**Significance:**  Mar 24, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Follow Operability Determination Procedure**

The NRC identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," for failure to follow Procedure APA-ZZ-00500, Appendix 1, "Operability and Functionality Determinations." The inspectors determined that the licensee failed to provide a reasonable expectation of operability for the degraded condition. Specifically, the licensee failed to account for both auxiliary feedwater as an essential service water system load and fouling resistance in the component cooling water system heat exchanger. Long term corrective actions planned include a modification of the component cooling water heat exchangers divider plate during the upcoming April 2010 refueling outage. The licensee placed this issue in their corrective action program as Callaway Action Request 201001152.

This finding was determined to be greater than minor because it impacted the Mitigating Systems Cornerstone attribute of human performance and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," this issue screened as very low safety significance because it was not a design or qualification deficiency that resulted in a loss of operability or functionality, did not create a loss of system safety function of a single train for greater than the technical specification

allowed outage time and did not affect seismic, flooding, or severe weather initiating events. This finding has a crosscutting aspect in the area of human performance associated with the decision making component because the licensee failed to use conservative assumptions when performing operability evaluations [H.1(b)].

Inspection Report# : [2010002](#) (*pdf*)

**Significance:**  Mar 24, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Ensure Suitable Replacement Parts Essential for the Operation of the Component Cooling Water System**

The NRC identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” after the licensee failed to adequately select suitable replacement gaskets essential to the operation of the component cooling water system heat exchangers. On October 19, 2008, Callaway engineering personnel identified that the component cooling water heat exchangers, due to corrosion and inadequate gasket sealing, had a small gap between the divider plate and channel head such that it allowed essential service water flow to bypass the heat exchanger which resulted in a reduced heat transfer capability. Corrective actions to address the identified gap in the component cooling water heat exchanger were scheduled to be implemented during the licensee’s next refueling outage. The licensee entered the issue in the corrective action program as Callaway Action Request 201001900.

This finding was greater than minor because it was associated with the Mitigating Systems Cornerstone attribute of design control and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, “Phase 1 – Initial Screening and Characterization of Findings,” this issue screened as very low safety significance because it was not a design or qualification deficiency that resulted in a loss of operability or functionality, did not create a loss of system safety function of a single train for greater than the technical specification allowed outage time and did not affect seismic, flooding, or severe weather initiating events. This finding was determined not to have a crosscutting aspect since it is a performance deficiency not reflective of current licensee performance.

Inspection Report# : [2010002](#) (*pdf*)

**Significance:**  Mar 24, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Maintain an Adequate Ultimate Heat Sink Thermal Performance Analysis**

The NRC identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” after AmerenUE failed to provide adequate design control measures for verifying the adequacy of the ultimate heat sink thermal performance analysis evaluating the impact of heat rejected during a large break loss of coolant accident. The thermal performance analysis, most recently revised in 2007, did not account for a potential single active failure of each train’s motor-operated valve designed to redirect the essential service water return flow up and over the tower fill material. With further analysis the licensee determined that a compensatory measure implementing a more restrictive initial operating range based on pond volume and initial temperature would ensure that the ultimate heat sink pond will not exceed its maximum temperature of 92.3 degrees Fahrenheit during a design basis accident. Corrective actions were being developed using Callaway Action Request 201001813.

This finding was determined to be greater than minor because it impacted the Mitigating Systems Cornerstone attribute of design control and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. A resident inspector performed the initial significance determination for the inoperable essential service water system, under certain conditions, using the NRC Inspection Manual 0609, Attachment 0609.04,

“Phase 1 – Initial Screening and Characterization of Findings.” The finding screened to a Phase 2 significance determination because it involved the potential inoperability of both trains of essential service water for greater than the technical specification allowed outage time. A Region IV senior reactor analyst performed a Phase 2 significance determination and found that the finding was potentially greater than green. The senior reactor analyst then performed a bounding Phase 3 significance determination and found the finding to be of very low safety significance (Green). The dominant core damage sequences included a medium break loss of coolant accident concurrent with the failure of essential service water system cooling tower bypass valves. The finding was mitigated because the motor operated

valves remained functional throughout the year, which minimized the frequencies for the scenarios of interest. This finding was determined to not have a crosscutting aspect as the calculation of record was not reflective of current licensee performance.

Inspection Report# : [2010002](#) (pdf)

**Significance:**  Dec 31, 2009

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Maintain and Adequate Flooding Analysis**

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” after AmerenUE failed to provide adequate design control measures for verifying the adequacy of flooding analysis for the auxiliary feedwater pipe chase room 1206/1207. The revised calculation, performed on December 4, 2001, determined that the 10-inch piping from the condensate storage tank going to the main condenser was the limiting source of potential flooding. However several missing or incorrect assumptions challenged the basis for operability of safety related auxiliary feedwater pump transmitters located in the room 22 inches above the floor level. On December 16, 2009, the licensee reperformed the flooding analysis calculation, M-FL-04, Revision 5, including the main condenser as an additional source of flooding. Although 984 gpm of margin was lost due to inclusion of the condenser as a source, the revised analysis supported an operability determination for the transmitters as operable.

This finding was determined to be greater than minor because it impacted the Mitigating Systems Cornerstone attribute of design control and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, “Phase 1 – Initial Screening and Characterization of Findings,” this issue screened as very low safety significance because it was not a design or qualification deficiency that resulted in a loss of operability or functionality, did not create a loss of system safety function of a single train for greater than the technical specification allowed outage time, and did not increase the likelihood of a seismic, flooding, or severe weather initiating event. This finding was determined to not have a crosscutting aspect as the calculation of record was not reflective of current licensee performance.

Inspection Report# : [2009005](#) (pdf)

**Significance:**  Dec 31, 2009

Identified By: NRC

Item Type: NCV NonCited Violation

### **Two Examples of Failure to Follow Operability Determination Procedure**

The NRC identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures and Drawings,” for two examples of failure to follow Procedure APA-ZZ-00500, Appendix 1, “Operability and Functionality Determinations.” The first example occurred on January 14, 2009, following an immediate operability determination made in response to Callaway Action Request 200900231. That Callaway action request documented significant emergency diesel generator heat exchanger tube wall thinning during eddy current testing. The operability determination performed in response to the degraded condition identified in Callaway Action Request 200900231 assumed a linear rate of degradation based on the rate observed from 2006 to 2008 and extrapolated forward to predict when heat exchanger tube plugging limits would be exceeded. Subsequent eddy current testing by the licensee found that the assumed linear degradation rate was nonconservative. The inspectors determined that the licensee failed to provide a reasonable expectation of operability consistent with the requirements of licensee Procedure APA-ZZ-00500, Appendix 1. Specifically, the licensee assumed a nonconservative linear rate of degradation for demonstrating emergency diesel heat exchanger operability despite empirical data that suggested the rate increased as a function of time.

The second example occurred on December 10, 2009, following initiation of Callaway Action Request 200910153 which documented that the steam generator C atmospheric steam dump valve (ABPV0003) would not repeatedly stroke to the same position. The Callaway action request documented that some amount of foreign material within the valve positioner was the cause of the repeatability issue with the valve. The inspectors reviewed Callaway Action Request 200910153 and noted that an immediate operability determination was not made on the identified degraded condition of foreign material within the air supply to the steam generator atmospheric steam dump valves. Since all four steam generator atmospheric steam dump valves share a common instrument air supply, the inspectors

determined that the licensee failed to identify what structures, systems, and components were affected by the degraded condition in Callaway Action Request 200910153. Following questioning by the inspectors, the licensee tested the remaining three steam generator atmospheric steam dump valves. During that testing, the licensee found the steam generator B atmospheric steam dump valve would not consistently stroke and that there was a small amount of foreign material within the air operated valve positioner.

This finding was determined to be greater than minor because it impacted the Mitigating Systems Cornerstone attribute of human performance and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," this issue screened as very low safety significance because it was not a design or qualification deficiency that resulted in a loss of operability or functionality, did not create a loss of system safety function of a single train for greater than the technical specification allowed outage time and did not affect seismic, flooding, or severe weather initiating events. This finding has a crosscutting aspect in the area of human performance associated with the decision making component because the licensee failed to use conservative assumptions when performing operability evaluations [H.1(b)].

Inspection Report# : [2009005](#) (pdf)

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## Barrier Integrity

**Significance:**  Sep 23, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Implement Adequate Administration Controls for Failed Containment Isolation Valve**

The inspectors identified a green noncited violation of Technical Specification 3.6.3, "Containment Isolation Valves," after the licensee failed to implement adequate administrative controls following the failure of valve EGHV0059. On August 10, 2010, containment isolation valve EGHV0059 failed to indicate full closed in the control room. The licensee declared the valve inoperable and isolated the affected penetration flow path. To ensure reactor coolant pump cooling the licensee unisolated the penetration by opening valve EGHV0131 and placing it under administrative controls. The on-shift operations technician was assigned to isolate the penetration in the event containment isolation was required. The resident inspectors found the licensee's administrative controls were not consistent with the requirements in the technical specification bases which required a dedicated operator at the valve. The licensee then stationed a dedicated operator at valve EGHV0131 while repairs were conducted on valve EGHV0059. This issue was entered into the licensee's corrective action program as Callaway Action Request 201007644.

This finding is more than minor because it was associated with the Barrier Integrity Cornerstone attribute of procedural quality and affects the associated cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the issue was determined to represent an actual open pathway in the physical integrity of reactor containment. Using Manual Chapter 0609, Appendix H, "Containment Integrity Significance Determination Process," the issue was determined to be a Type B finding of very low safety significance since the containment penetration was associated with a closed system and would generally not contribute to large early release frequency. This finding has a crosscutting aspect in the area of human performance associated with the resources component because the licensee failed to ensure procedures used for addressing administrative controls were accurate and consistent with the technical specification bases [H.2(c)].

Inspection Report# : [2010004](#) (pdf)

**Significance:**  Jun 23, 2010

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **Failure to Maintain Two Operable Source Range Channels During Core Alterations**

The inspectors identified a self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," when the licensee's inadequate procedure and failure to control work activities during a reload of the reactor vessel fuel

assemblies resulted in deenergization of all available source range nuclear instrument channels. On May 6, 2010, while in Mode 6 – Refueling, licensee testing of nuclear instrument power range channel N44 and maintenance on 120 Vac instrument bus NN03 affecting power range channel N43 made up the logic for permissive P-10. The permissive sent a protective logic signal to deenergize both available source range nuclear instruments. The control room immediately directed the fuel handling crew to stop fuel movement until the source range channels could be restored. A fuel assembly was in the upender ready for transfer to the reactor vessel core location at the time. The licensee placed this issue into the corrective action program as Callaway Action Request 201004301.

This finding is more than minor because it was associated with the configuration control attribute of the Barrier Integrity Cornerstone and affects the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or releases. Using Manual Chapter 0609 Appendix G, Attachment 1, “Shutdown Operations Significance Determination Process Phase 1 - Operational Checklists for Both PWRs and BWRs,” this finding was of very low safety significance because it did not increase the likelihood of a loss of reactor coolant system inventory, did not degrade the licensee’s ability to terminate a leak path or add reactor coolant system inventory when needed, and did not degrade the licensee’s ability to recover decay heat removal once lost. This finding had a crosscutting aspect in the area of human performance associated with the work control component because the licensee failed to coordinate work activities by incorporating actions to address the impact of the work on different job activities and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance.

Inspection Report# : [2010003](#) (*pdf*)

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## Emergency Preparedness

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## Occupational Radiation Safety

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## Public Radiation Safety

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## Physical Protection

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not provided to a possible adversary. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## Miscellaneous

Last modified : November 29, 2010