

Callaway

4Q/2007 Plant Inspection Findings

Initiating Events

Significance:  Sep 22, 2007

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Follow Maintenance Instructions Affecting the Letdown Backpressure Control Valve.

A self-revealing Green noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified after the licensee failed to follow reassembly procedures for the letdown system backpressure control valve. In April 2007, during reassembly of letdown pressure control Valve BGPCV0131, Callaway maintenance personnel failed to install an alignment cage spacer. On September 7, 2007, a failed pressure transmitter combined with malfunctioning Valve BGPCV0131 caused upstream letdown relief Valve BG8117 to lift, diverting water into the pressurizer relief tank at a rate of 119 gpm until operators isolated letdown to stop the leakage.

This finding is greater than minor because, similar to Example 5b provided in Manual Chapter 0612, Appendix E, the licensee's failure to follow assembly procedures resulted in Valve BGPCV0131 being returned to service with a missing part. This finding, involving reactor coolant system letdown, affected the initiating events cornerstone equipment performance attribute and affected the objective to limit the likelihood of those events that upset plant stability and challenged critical safety functions during power operations. The inspectors used the Manual Chapter 0609, "Significant Determination Process," Phase 1 worksheet to analyze this finding. The inspectors determined this finding is of very low safety significance because it did not result in exceeding the Technical Specification limit for identified reactor coolant system leakage and did not affect any mitigating systems. This finding has a crosscutting aspect in the area of human performance associated with the work practices component because licensee personnel failed to follow established procedures (H.4(b)). This issue was entered into the licensee's corrective action program as Callaway Action Request 200708233.

Inspection Report# : [2007004](#) (*pdf*)

Significance:  Mar 24, 2007

Identified By: NRC

Item Type: FIN Finding

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

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

This finding is greater than minor because the failure to adequately manage operator workarounds could reasonably be viewed as a precursor to a significant event. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the inspectors determined that this finding is only of very low significance because the condition did not result in the reactor coolant system technical specification leakage limit being exceeded, did not contribute to both the likelihood of a reactor trip and the likelihood that mitigating equipment or functions would be unavailable, and did not increase the likelihood of a fire or internal/external flood. This finding has a crosscutting aspect in the area of human performance associated with the work control component because AmerenUE did not plan work activities to support long-term equipment reliability by limiting operator workarounds (H.3(b)). The licensee entered this finding into their corrective action program as Callaway Action Request 200700517.

Inspection Report# : [2007002](#) (*pdf*)

Mitigating Systems

G

Significance: Sep 22, 2007

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Promptly Correct a Condition Adverse to Quality for Train B Motor-driven Auxiliary Feedwater Pump

A self-revealing Green noncited violation of 10 CFR 50, Appendix B, Criteria XVI, "Corrective Action," was identified after the licensee allowed the Train B motor-driven auxiliary feedwater pump to be returned to service even though maintenance personnel could not meet the coupling shaft separation tolerance during a maintenance activity on April 12, 2007. Engineering personnel approved deviating from the coupling shaft separation tolerance without considering the impact on the motor thrust bearing. On July 4, 2007, motor disassembly revealed that there was damage to the thrust bearing caused by the inadequate shaft separation distance.

This finding is greater than minor because, similar to Example 5b provided in Manual Chapter 0612, Appendix E, the licensee's failure to address the impact of plant changes allowed the component to be returned to service prior to correcting the problem. This finding was associated with the mitigating systems cornerstone equipment performance attribute and affected the objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors used the Manual Chapter 0609, "Significant Determination Process," Phase 1 worksheet to analyze this finding. The inspectors determined this finding is of very low safety significance because it is not a design or qualification deficiency confirmed to result in loss of operability per Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessment;" did not result in loss-of-safety function of a single train for greater than the Technical Specification allowed outage time; and was not a potentially risk significant seismic, flooding, or severe weather event. This finding has a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because engineering personnel did not thoroughly evaluate the apparent problem with the coupling (P.1 (c)). This issue was entered into the licensee's corrective action program as Callaway Action Request 200708752.

Inspection Report# : [2007004](#) (*pdf*)

G

Significance: Jun 23, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Ineffective Corrective Actions to Evaluate the Design Basis for an Ultimate Heat Sink Workaround

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," after AmerenUE failed to implement effective corrective actions to correct discrepancies in the ultimate heat sink design basis. The system design basis required the ultimate heat sink automated temperature controller to align the cooling tower only when outside temperatures were above 80 degrees Fahrenheit. AmerenUE allowed manual operation of the system when temperatures were above 47 degrees Fahrenheit. The engineering staff and later the quality assurance staff independently identified that the design basis operating requirements had not been adequately evaluated. The inspectors identified that the corrective actions assigned had been closed out as complete without problem resolution and that the ultimate heat sink cooling towers were operated on April 3, 2007, when outside conditions were below 29 degrees Fahrenheit. The uncontrolled workaround resulted in AmerenUE subjecting the cooling tower fill material and fan to freezing conditions.

This finding is greater than minor because it is associated with the mitigating systems cornerstone equipment performance attribute and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, this finding was determined to have very low safety significance because it affected the mitigating systems cornerstone, which was both a performance and design deficiency that did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. This finding has a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because the licensee did not thoroughly evaluate problems such that the resolution would address causes and extent of conditions, as necessary (P.1(c)). This issue was entered into the

licensee's corrective action program as Callaway Action Request 200703584.

Inspection Report# : [2007003](#) (*pdf*)

G

Significance: Jun 23, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Identify and Correct Essential Service Water Pipe Wall Thinning

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," after AmerenUE's past corrective actions were inadequate to identify and correct essential service water piping degradation due to corrosion. AmerenUE identified that nondestructive examinations were required to determine the extent of condition of microbiological influenced corrosion on the 30-inch and 8-inch essential service water piping. On May 3, 2007, operability determinations used to support Refueling Outage 15 restart stated that 100 percent of the low flow area accessible piping would be tested using nondestructive examination. On May 26, 2007, microbiological influenced corrosion caused a new through-wall leak in the control building low flow, accessible piping. The licensee's extent of condition review was not adequate to identify the corroded pipe prior to the through-wall leak.

This finding, associated with failure to implement corrective action, is greater than minor because, if left uncorrected, this finding would become a more significant safety concern. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, this finding was determined to have very low safety significance because it affected the mitigating systems cornerstone, was both a performance and design deficiency that did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. This finding has a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because the licensee did not thoroughly evaluate problems such that the resolution would address causes and extent of conditions, as necessary (P.1(c)). This issue was entered into the licensee's corrective action program as Callaway Action Request 200705489.

Inspection Report# : [2007003](#) (*pdf*)

G

Significance: Mar 24, 2007

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Inoperable Auxiliary Feedwater Pump due to an Inadequate Surveillance Procedure

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

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

Inspection Report# : [2007002](#) (*pdf*)

G

Significance: Mar 24, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Corrective Actions to Preserve Essential Service Water System Material Condition

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

This finding is greater than minor because it is associated with the reactor safety mitigating systems cornerstone and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, this finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. This finding has a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because AmerenUE did not fully evaluate essential service water corrosion issues to ensure that the resolutions adequately addressed the causes and extent of condition needed to ensure nuclear safety (P.1(c)). This issue was entered into the licensee's corrective action program as Callaway Action Request 200702724.

Inspection Report# : [2007002](#) (*pdf*)



Significance: G Jan 12, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Refueling Water Storage Tank Vent Sizing Calculation

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, Design Control, for an inadequate refueling water storage tank vent sizing calculation. The calculation assumed that only one low head safety injection pump would operate when it should have assumed that all six emergency core cooling and containment spray pumps would take suction from the tank. When corrected, the revised calculation resulted in reducing the allowable vent blockage area from approximately 68 percent to 30 percent. In response to the teams concerns, the licensee inspected the vent and found a small mesh screen on the vent's exterior, which reduced the available design margin to approximately 5 percent. Subsequently, the licensee performed a new finite element analysis to demonstrate that sufficient margin existed to account for screen blockage scenarios, such as freezing rain. The licensee has entered this finding into their corrective action program as Callaway Action Requests 200610359 and 200700115.

The failure to meet design control requirements associated with the refueling water storage tank vent design was a performance deficiency. This finding is more than minor because it affected the mitigating system cornerstone objective (design control attribute) to ensure the reliability and capability of the equipment needed to mitigate initiating events. The finding also affected the barrier integrity cornerstone objective (design control attribute) of providing physical design barriers, such as containment, to protect the public from radio nuclide releases caused by accidents or events. The team used the Manual Chapter 0609, Significance Determination Process Phase 1 screening worksheet and determined that the finding required a Phase 2 significance determination because it impacted two different cornerstones (mitigating systems and barrier integrity). The team performed a Phase 2 significance determination and determined that the finding was of very low safety significance. Only the large break loss-of-coolant accident sequence was affected. In addition, the safety injection and containment spray systems remained available.

Inspection Report# : [2006009](#) (*pdf*)

G**Significance:** Jan 12, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Emergency Diesel Generator Fuel Oil Verification

The team identified a noncited violation of Technical Specifications Surveillance Requirement 3.8.3.3 for the failure to verify that fuel oil testing results were within the specified limits. Consequently, fuel oil that was transferred to the Train A storage tank in October 2005 was out of specification for cetane and no actions were taken to evaluate or otherwise address the concern until identified by the NRC. The licensee has entered this finding into their corrective action program as Callaway Action Request 200700100.

The failure to follow plant technical specifications and properly verify that the cetane level of new fuel oil was within the limits of the Diesel Fuel Oil Testing Program was a performance deficiency. The finding was more than minor because it was associated with the mitigating systems cornerstone objective (human performance attribute) of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, Phase 1 screening worksheet, the issue screened as having very low safety significance because it was a design deficiency confirmed not to result in loss-of-operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment. This finding had a crosscutting aspect in the area of human performance (work practices attribute), in that the chemistry technician failed to use appropriate self-checking work practices when verifying the sample results H.4(a).

Inspection Report# : [2006009](#) (*pdf*)**G****Significance:** Jan 12, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Emergency Diesel Generator Heat Exchanger Tube Plugging Calculation

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, Design Control, for the failure to properly calculate the tube plugging limit for the emergency diesel generator intercooler, jacket water, and lube oil cooler heat exchangers. The calculation determined that approximately 1/3 of the tubes could be plugged without challenging emergency diesel generator operability under worst case design basis conditions. When corrected, the revised calculation resulted in reducing the allowable number of plugged tubes by approximately 40 percent. The licensee has entered this finding into their corrective action program as Callaway Action Requests 200700063 and 200700096.

The failure to implement appropriate design controls for safety-related tube plugging calculations was a performance deficiency. This finding is more than minor because it affected the mitigating system cornerstone objective (Design Control) to ensure the reliability and capability of the equipment needed to mitigate initiating events. In addition, the finding was more than minor because, if left uncorrected, it could result in a more significant safety concern. Specifically, if the heat exchanger tubes were plugged to the limit the heat exchangers may be inoperable under certain design basis conditions (i.e., higher essential service water temperatures). Using the Manual Chapter 0609, Phase 1 screening worksheet, the issue screened as having very low safety significance because it was a design deficiency confirmed not to result in loss-of-operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment.

Inspection Report# : [2006009](#) (*pdf*)**G****Significance:** Jan 12, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Translate Essential Service Water Cooling Tower Design Basis Information into Specifications and Procedures.

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, Design Control, for the failure to properly translate design requirements into procedures and instructions. Specifically, the cooling tower sizing calculation specified that a flow rate of 15,000 gallons per minute was necessary to meet design basis accident needs but flow balance procedures only required a flow rate of 11,724 gallons per minute. The licensee has entered this finding into their corrective action program as Callaway Action Request 200700218.

The team determined that the failure to properly translate design information (essential service water flow rate through the cooling tower) into specifications and procedures was a performance deficiency. This finding was more than minor because it affected the mitigating system cornerstone objective (Procedure Quality Attribute) to ensure the reliability and capability of the equipment needed to mitigate initiating events. Further, if left uncorrected, it could lead to a more significant issue. Specifically, information from the calculation could be used in other design documents and operability determinations. Over-predicting cooling tower capability could mask other operational issues. Using the Manual Chapter 0609, Phase 1 screening worksheet, the team determined that the finding had very low safety significance (Green) because the finding was a design deficiency confirmed not to result in loss of operability in accordance with Part 9900 Technical Guidance, Operability Determination Process for Operability and Functional Assessment.

Inspection Report# : [2006009](#) (*pdf*)

Significance:  Jan 12, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Initiate an Operability Evaluation for Water Hammer Concerns.

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, Procedures, for the failure to follow Callaway Plant procedure requirements associated with operability determinations. Specifically, engineers had identified that a water hammer was causing two residual heat removal system relief valves to fail and that the water hammer would likely recur in certain situations. The engineers failed to take the procedurally required actions to initiate a formal operability determination to evaluate the potential impact to the residual heat removal system pressure boundary. The licensee has entered this finding into their corrective action program as Callaway Action Request 200609805.

The failure to follow a Callaway Plant procedure was a performance deficiency. The finding was more than minor because it was associated with the mitigating systems cornerstone objective (Equipment Performance Attribute) of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, Phase 1 screening worksheet, the issue screened as having very low safety significance because it was a design deficiency confirmed not to result in loss-of-operability in accordance with NRC Manual Chapter Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment. This finding had a crosscutting aspect in the area of problem identification and resolution (corrective action program component), in that engineers failed to perform the necessary proceduralized corrective actions to ensure that operability was properly evaluated P.1.(c)).

Inspection Report# : [2006009](#) (*pdf*)

Barrier Integrity

Significance:  Jun 23, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Implement Foreign Material Controls for the Refueling Cavity with Reactor Head Removed

The inspectors identified a noncited violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," after refueling personnel did not maintain procedurally required foreign material exclusion barriers. AmerenUE's foreign material exclusion procedure specified attaching foreign material exclusion curtains to the plant north end of the reactor head missile shield to ensure no foreign material was introduced into the reactor vessel. On April 19, 2007, the inspectors observed the reactor refueling task and noted that there were no curtains acting as the north refueling cavity boundary.

This finding is greater than minor because, if left uncorrected, introduction of foreign material into the reactor cavity would become a more significant safety concern. The barrier integrity cornerstone human performance attribute is used to ensure foreign material and loose parts do not challenge fuel cladding. The inspectors determined this finding to be of very low safety significance using the significance determination process for at-power reactor situations. The

inspectors used the at-power significance determination process because of the concern with foreign material impact on an operating reactor core. This finding is of very low safety significance per Inspection Manual Chapter 0609 because the condition was a fuel barrier issue. This finding had a crosscutting aspect in the area of human performance associated with the resources component because plant operators failed to follow procedures established to prevent the introduction of foreign material into the reactor vessel (H.4(b)). This issue was entered into the licensee's corrective action program as Callaway Action Request 200704169.

Inspection Report# : [2007003](#) (*pdf*)

Significance:  Jan 12, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Corrective Action for Refueling Water Storage Tank Vortexing Concerns

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI (Corrective Action) for the failure to take adequate corrective actions following the identification of a condition adverse to quality. Specifically, the licensee had identified, in part, that a safety-related refueling water storage tank sizing calculation had failed to consider vortexing at the tank suction inlet piping. This phenomena can cause air entrainment in pumps, which can lead to pump failure. The corrective measures were inadequate because engineers inappropriately used the margin associated with instrument uncertainty as if it were available design margin. The licensee has entered this finding into their corrective action program as Callaway Action Request 200700224.

The team determined that the failure to take effective corrective measures to address a condition adverse to quality (failure to address vortexing in the refueling water storage tank sizing calculation) was a performance deficiency. The finding was more than minor because it affected the barrier integrity cornerstone objective (design control attribute) to provide reasonable assurance that physical design barriers (including the containment) protect the public from radio nuclide releases caused by accidents or events. The finding had crosscutting aspects in the area of problem identification and resolution (Operating Experience Attribute), in that the licensee had failed to adequately address the industry operating experience P.2(b)).

Inspection Report# : [2006009](#) (*pdf*)

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

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.

Miscellaneous

Last modified : February 04, 2008