

Callaway

1Q/2009 Plant Inspection Findings

Initiating Events

Significance:  Mar 24, 2009

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Inadequate Response to Feedwater Transient Results in Reactor Trip

The inspectors identified a self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," after operator response to an electrical fault on the condensate Pump C motor resulted in an unplanned and unnecessary reactor trip, feedwater isolation, and auxiliary feedwater actuation. On December 11, 2008, Callaway Plant experienced an automatic turbine trip/reactor trip during a power reduction initiated by the operators' response to a loss of condensate Pump C. The control room supervisor directed a power reduction without immediately referencing Procedure OTO AE 00001 guidance and without specifying any magnitude or rate limitations on the power reduction. The balance of plant reactor operator, not aware of the procedural limitations, initiated the power reduction using the turbine controls 'load limiter' potentiometer. This method of turbine load control eliminated all automatic rate-limiting functions. The steam generator levels increased rapidly with sluggish main feedwater regulating valves slowing anticipatory response. The steam generator P-14 high-high level turbine trip/reactor trip occurred about 5 minutes after condensate Pump C had tripped.

This finding was greater than minor because it was associated with the Initiating Events cornerstone attribute of procedural quality and it affected the objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. 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. The finding had a crosscutting aspect in the area of human performance associated with the work practices component because the licensee failed to effectively establish clear expectations and standards regarding procedurally directed actions versus actions viewed as necessary to stabilize a plant transient.

Inspection Report# : [2009002](#) (*pdf*)

Significance:  Mar 24, 2009

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Intermediate Range Hi Flux Reactor Protection System Actuation While Shutdown

The inspectors identified a self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," after maintenance on intermediate range nuclear Instrument N36 resulted in an unanticipated reactor trip signal and feedwater isolation. On December 12, 2008, Callaway instrumentation and controls maintenance personnel performed work to replace a circuit card associated with the intermediate range nuclear Instrument P 6 bistable. At the time of the maintenance, the plant was in Mode 3 with the reactor trip breakers open. Shortly after beginning work, an intermediate range high flux reactor trip signal was generated. The trip signal was generated because the bypass of the reactor trip bistables is removed upon removal of the control power fuses. With instrument power removed, the solid state protection system perceived a high intermediate range neutron flux condition and generated a reactor trip signal and feedwater isolation. Control room operators responded to the feedwater isolation by starting both motor-driven auxiliary feedwater pumps and restoring steam generator water levels to the program band. The licensee later determined that instrumentation and controls maintenance personnel were unaware that pulling the control power fuses would cause a reactor trip signal and that the step in the work instruction that directed the removal of the control power fuses had not received an adequate review.

This finding was greater than minor because the finding 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 issue was entered into the licensee's corrective action program as Callaway Action Request 200812681. The finding had a crosscutting aspect in the area of human performance associated with the work controls component because the licensee failed to coordinate the impact of changes to the work scope or activity, specifically, the licensee failed to fully evaluate the impact of removal of control power fuses on the work instructions.

Inspection Report# : [2009002](#) (pdf)

Significance:  Feb 27, 2009

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Correct Problems with Fire Protection Impairment Permits

An NRC identified violation of License Condition 2.C.(5), "Fire Protection," was identified for failing to effectively correct problems with the issuance and establishment of Fire Protection Impairment Permits. After problems were identified in 2006 and 2007, as a corrective action, the licensee conducted training in 2008 on the program requirements in the Maintenance and Operations Departments. Despite this corrective action, the licensee continued to experience failures to request a fire impairment and failures to implement pre-planned impairments. Some failures involved oversight problems for contract workers, who were not addressed in the training. Two procedural violations occurred in late 2008 that involved the failure to establish a Fire Protection Impairment Permit before performing hot work. The licensee has entered the issue into the corrective action program as Callaway Action Request (CAR) 200901638.

The inspectors determined that failing to correct problems associated with the use of required Fire Protection Impairment Permits is a performance deficiency. The finding is more than minor because it affects the protection against external factors attribute of the initiating events cornerstone, and it directly affects the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Using the NRC Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," Phase 1 worksheet, the finding was determined to be of very low safety significance (Green) because the condition represented a low degradation of fire prevention and administrative controls. The cause of the finding is related to the Human Performance cross-cutting component of Work Practices, in that the licensee failed to effectively communicate expectations and personnel failed to follow procedures [H.4.b].

Inspection Report# : [2009006](#) (pdf)

Significance:  Dec 31, 2008

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to maintain an adequate plant shutdown procedure

The inspectors identified a self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," after improper isolation of the main steam isolation valves by the Callaway control room operators resulted in a reactor trip signal and auxiliary feedwater actuation on October 11, 2008. Procedure OTG ZZ 00006, "Plant Cooldown Hot Standby to Cold Shutdown," allowed premature main steam isolation valve closures just after entering Mode 4. The operator then decided to reopen main steam isolation Valve A and atmospheric Steam Dump A. This created a significant increase in steam flow from the steam generator which caused the steam generator level to swell up to the P 14 steam generator high level feedwater isolation setpoint. The steam generator levels all decreased to the steam generator narrow range low-low setpoint generating the need for auxiliary feedwater actuation.

This finding was greater than minor because it was associated with the Initiating Events cornerstone attribute of procedural quality and it affected the objective to limit the likelihood of those events that upset plant stability and

challenge critical safety functions during shutdown as well as power operations. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding is determined to be of very low safety significance since this finding did not affect the Technical Specification limit for reactor coolant system leakage, 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 had a crosscutting aspect in the area of human performance associated with the decision making component because the licensee failed to communicate, in a timely manner, decisions to personnel who have a need to know the information in order to perform work safely. Inspection Report# : [2008005](#) (pdf)

Significance:  Dec 31, 2008

Identified By: Self-Revealing

Item Type: FIN Finding

Failure to evaluate material equivalencies leads to a manual reactor trip

The inspectors identified a self-revealing finding for failure of the engineering department to perform a material equivalency evaluation to ensure replacement components do not adversely affect plant operations. On November 11, 2008, Callaway Plant experienced a trip of main feedwater Pump B due to low lube oil pressure. Since the reactor was at greater than 80 percent power, the plant operators inserted a manual reactor trip. Following the reactor trip, maintenance personnel discovered two pieces of o-ring foreign material within main feedwater Pump B bearing oil supply pressure regulating Valve FCV0970. The foreign material was found wrapped around the regulating spring which inhibited valve movement and caused the lube oil low pressure condition. The licensee determined that the ethylene propylene diene M-class type o-ring became pliable when exposed to lube oil and was allowed to fall and be introduced into the system as foreign material. The ethylene propylene diene M-class o-rings had been approved as an equivalent replacement in July 1999 for the vendor recommended Buna-N type o-rings without performing an engineering material equivalency evaluation. Buna-N material is approved for use in petroleum based systems while ethylene propylene diene M-class is not.

This finding is greater than minor because it is associated with the design control attribute of the Initiating Events cornerstone and affects the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown and power operations. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding is determined to be potentially risk significant because it contributed to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available. When evaluated per Manual Chapter 0609 Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," and the Callaway Plant Phase 2 pre-solved table item "Failure to Reestablish Main Feedwater," the inspectors determined this finding to be of very low safety significance. This issue was entered into the licensee's corrective action program as Callaway Action Request 200811781. This finding was determined to not have a crosscutting aspect because the performance deficiency is not indicative of current licensee performance.

Inspection Report# : [2008005](#) (pdf)

Mitigating Systems

Significance:  Dec 31, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate shutdown risk assessment for maintenance activities in the reactor building.

The inspectors identified a noncited violation of 10 CFR 50.65(a)(4), for failure to adequately assess and manage shutdown risk associated with maintenance activities in the reactor building. Specifically, on October 15, 2008, the inspectors found foreign material exclusion covers installed on the Train B containment recirculation sump. The covers were installed on October 14, 2008, per the direction of the containment coordinator without notification to the control room. The covers were installed to prevent debris from entering the sump. Following discussions with operations personnel, the inspectors found that the Train B containment recirculation sump was inappropriately

credited in the licensee's shutdown safety assessment. An updated shutdown safety assessment was performed and it was determined that plant risk remained yellow.

This finding is greater than minor because the licensee's risk assessment inappropriately credited risk-significant structures, systems and components that were unavailable during maintenance. This finding affected the Mitigating Systems cornerstone. Using Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process," the finding was found to be of very low safety significance because the licensee maintained two trains of decay heat removal operable and adequate equipment was available to support feed and bleed operations for at least 24 hours. This issue was entered into the licensee's corrective action program as Callaway Action Request 200810540. This finding had a crosscutting aspect in the area of human performance associated with the decision making component because the licensee failed to obtain interdisciplinary input on safety-significant or risk-significant decisions. Specifically, the containment coordinator made a decision affecting the availability of the containment recirculation sumps without consulting the control room to determine the impact on plant risk.

Inspection Report# : [2008005](#) (pdf)

Significance:  Dec 31, 2008

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to ensure the suitability of the design of the residual heat removal Train A pump room cooler

The inspectors identified a self-revealing Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," after a trip of the residual heat removal Train A room cooler fan revealed that AmerenUE had not adequately selected and reviewed the suitability of the newly installed fan motor thermal overloads. Additionally, the NRC inspectors identified that the postmaintenance testing prescribed for the modified fan motor breaker did not allow sufficient time to challenge the thermal overload settings. On October 8, 2008, residual heat removal Train A room cooler fan shut down after only 22 minutes of run time. The breaker replacement modification used a calculation originally performed for the initial design of the old breaker which did not account for the cooler fan motor being a 20 horsepower motor nameplated down to a 10 horsepower rating.

This finding is greater than minor because it is similar to Manual Chapter 0612 "Examples of Minor Issues," Example 3j, in that the engineering calculation error resulted in a condition where there was a reasonable doubt on the operability of the component and a significant programmatic deficiency associated with postmaintenance test requirements was identified that could lead to worse errors if uncorrected. The inspectors determined that the finding impacted the Mitigating Systems cornerstone. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the 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 Technical Specification allowed outage time and did not affect seismic, flooding, or severe weather initiating events. This issue was entered into the licensee's corrective action program as Callaway Action Request 200810223. The inspectors determined that this finding had a crosscutting aspect in the area of problem identification and resolution associated with the corrective action component because the AmerenUE modification for certain motor control center breakers failed to have a low enough threshold to identify fan motor rating and thermal overload setting errors.

Inspection Report# : [2008005](#) (pdf)

Significance:  Dec 31, 2008

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to adequately implement plant equipment control tagout procedure

The inspectors identified a self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," after improper restoration of the essential service water supply to the emergency diesel generator Train A lubricating oil cooler resulted in significant water flow into the emergency diesel room on October 22, 2008. Two restoration evolutions associated with the essential service water and the emergency diesel generator systems had been proceeding in parallel. The reactor operator restoring the emergency diesel generator assumed the essential service

water supply was to remain isolated to the emergency diesel generator and thus changed the already approved worker protection assurance Clearance 71899 to leave the oil cooler drain valve open with no tag. Starting the essential service water pump pressurized the drain valve and produced significant water spray flow into the emergency diesel generator room until noticed by a diesel vendor representative about 30 minutes later.

This finding was greater than minor because if left uncorrected the deficiencies could become a more significant safety concern. The finding affected the Mitigating Systems cornerstone. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding is determined to be of very low safety significance since this finding was not a design or qualification deficiency, did not represent a loss of system or train safety function and did not screen as potentially risk significant due to a flooding initiating event using the criteria on the characterization worksheet. This finding had a crosscutting aspect in the area of human performance associated with the work practices component because the licensee's pre-job briefing, self- and peer-checking, and proper documentation of activity were inadequate to overcome worker protection assurance clearance process problems and an inexperienced operating supervisor. These less than adequate worker practices resulted in personnel proceeding in the face of uncertainty.

Inspection Report# : [2008005](#) (pdf)

Significance: SL-IV Sep 24, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Submit a Licensee Event Report for a Condition Prohibited by the Plant's Technical Specifications

The inspectors identified a Severity Level IV noncited violation of 10 CFR 50.73(a)(1) for a failure to submit a required licensee event report within 60 days after discovery of an event requiring a report. On May 21, 2008, Callaway Plant personnel discovered a 6.6 cubic foot void of air within the safety injection system common suction piping. The voided piping, determined to have existed for over a year, was caused by relief valve maintenance on Valve EM8858A that occurred on May 7, 2007. Callaway Plant licensing staff performed a reportability evaluation and determined that the discovery of the void was not required to be reported to the NRC. The inspectors reviewed the licensee's reportability evaluation and associated past operability and determined the event was reportable since a postulated single failure had the potential to disable both emergency core cooling system trains during cold leg recirculation. Since the emergency core cooling system was inoperable from May 7, 2007, until May 21, 2008, the event resulted in an operation or condition which was prohibited by the plant's Technical Specifications as well as an event where a single cause or condition caused two independent trains to become inoperable in a single system.

This finding 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. This finding affected the mitigating systems cornerstone. 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 issue was entered into the licensee's corrective action program as Callaway Action Request 200810199. This finding has a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because the licensee failed to thoroughly evaluate a void discovered in the emergency core cooling system for operability and reportability.

Inspection Report# : [2008004](#) (pdf)

Significance:  Aug 22, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Safety Related 125 Vdc Station Battery NK11 Inadequate Battery Sizing Calculation

The team identified a non-cited violation 10 CFR 50, Appendix B, Criterion III, "Design Control," for failure to verify the adequacy of design and for failure to correctly translate the 125 Vdc system design basis into instructions, procedures, and drawings. Specifically, the licensee failed to include momentary loads in the battery sizing calculation, thus reducing the peak load demand voltage during the first minute of an event, an intermediate scenario event, and the last minute of the battery duty cycle. Additionally, the licensee's subsequent review determined that the

calculation had failed to include three additional momentary loads. The failure to include these loads prevented the licensee from developing a battery duty cycle profile that conforms to the guidance of IEEE 485-1983 and correctly simulates the battery loads following a design basis or station blackout event. The licensee entered this finding into their corrective action program as Callaway Action Request 200808609.

The failure to account for all loads, including momentary loads, in the battery design calculation was a performance deficiency because it prevented the licensee from correctly analyzing available voltage at safety-related components during the battery peak loading periods. The finding was more than minor because it is associated with the Design Control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the safety-related battery systems to respond to initiating events and prevent undesirable consequences. Using the Manual Chapter 0609, Phase 1 screening worksheet, the issue screened as having very low safety significance because adequate margins had been included in the battery selection and, therefore, the issue 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# : [2008008](#) (*pdf*)

Significance:  Aug 22, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Non-conservative Pipe Break Location for the Condensate Storage Tank Supply to Auxiliary Feedwater Pumps

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for not verifying the adequacy of the design. Specifically, an incorrect pipe break location in the analysis for loss of the condensate storage tank feed to the auxiliary feedwater pumps caused the analysis to be non-conservative for the amount of water available to the auxiliary feedwater pumps. This error provided for more water to be available for use by the auxiliary feedwater pumps than would actually be available if the analysis had identified the correct location of the postulated pipe break. The licensee has entered this finding into their corrective action program as Callaway Action Request CAR 200808674.

The failure to meet design control requirements associated with the pipe break analysis with sufficient water to run the auxiliary feedwater pumps prior to switch over to the essential service water system is a performance deficiency. Per Manual Chapter 0612, Appendix E, Section 3, "Non-significant Dimensional, Time, Calculation, or Drawing Discrepancies," Example J, this finding is more than minor because the engineering calculation error resulted in a condition where there was a reasonable doubt on the operability of a system or component. Using Manual Chapter 0609, Significance Determination Process Phase 1 screening worksheet, the team determined that the finding was of very low safety significance. There was no actual loss of safety function and the new analysis demonstrated that the auxiliary feedwater pumps would have enough water available from the Condensate Storage Tank prior to switchover to the Essential Service Water system to complete their design function.

Inspection Report# : [2008008](#) (*pdf*)

Significance:  Aug 22, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Auxiliary Feedwater Turbine Digital Control Panel FC219

The team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawing" for the failure to follow Procedure APA-ZZ-00500, Appendix 1, Revision 6, "Operability Determination." The evaluation did not include the additional heat loading on equipment in the turbine driven auxiliary feedwater pump room, caused from an active steam leak from the turbine governor end case joint. The licensee had failed to include the additional steam leak heat load in either of the room temperature calculations M-GF-415 or BO -05, which were used in the operability determination. The heat input into the room, due to the steam leak, may have adversely affected the operation of the turbine digital speed control unit. The licensee has entered this finding into their corrective action program as Callaway Action Request 200808777.

The failure to either correct the active steam leak or to account for the leak in their design calculations, is a performance deficiency. Per Inspection Manual Chapter 0612, Appendix E, Section 3, "Non-significant Dimensional, Time, Calculation, or Drawing Discrepancies," Example J, this finding is more than minor because the licensee had not resolved the deficiency, resulting in a condition in which there was a reasonable doubt regarding the reliability of the turbine digital speed control unit. Using Inspection Manual Chapter 0609, "Significance Determination Process," Phase 1 screening worksheets, the team determined that the finding was of very low safety significance. Since there was no actual loss of safety function and the new analysis demonstrated that the maximum room temperature, including the additional heat load, would not exceed the design limit of digital turbine speed controls unit, the issue was a design deficiency confirmed not to result in loss of operability per NRC Manual Chapter Part 9900, "Technical Guidance, Operability Determination Process for Operability and Functional Assessment." The finding had crosscutting aspects in the area of human performance (decision making) because the licensee used non-conservative assumptions in decision making and failed to either repair the active steam leak, or to account for it in their design calculations. This activity was indicative of current performance as the steam leak still existed and had not been included in the design calculations until October 2008.

Inspection Report# : [2008008](#) (*pdf*)

Significance:  Jun 24, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Surveillance Procedure Resulted in an Inoperable Emergency Core Cooling System

The inspectors identified a noncited violation of Technical Specification 3.5.2, "Emergency Core Cooling Systems," after an inadequate surveillance procedure resulted in the licensee failing to maintain the emergency core cooling system full of water as required per Technical Specification 3.5.2. On May 21, 2008, Callaway Plant engineering discovered that a section of the cold leg recirculation piping, specifically the discharge of the residual heat removal pumps to the safety injection pumps, contained 6.6 cubic feet of air. Callaway monthly surveillance Procedure OSP SA 00003, "Emergency Core Cooling Flow Path Verification and Venting," had a purpose to: "Verify the ECCS is full of water," in accordance with Technical Specification Surveillance Requirement 3.5.2.3. The monthly verification and vent procedure was not comprehensive enough to ensure all the emergency core cooling system was full of water.

This finding is more than minor because it was similar to Example 3e of NRC Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," and met the "Not Minor If," criteria because the failure to meet the licensee's administrative requirement for allowable void fraction impacted the ability of the Train A safety injection system to function upon initiation of high-pressure recirculation. This finding affected the mitigating systems cornerstone procedure quality attribute. Using the Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the inspectors determined that this finding should be evaluated using the Phase 2 process described in Manual Chapter 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations." As described in Section III, of Appendix A, given that the presolved table did not contain a suitable target or surrogate for this finding, the senior reactor analyst used the risk-informed notebook to evaluate the significance of this finding affecting only high-pressure recirculation as very low risk significance (Green). 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 a single vent valve was sufficient to vent the affected line rather than assuming that an additional installed valve was not necessary to completely fill, vent, and test the line [H.1(b)].

Inspection Report# : [2008003](#) (*pdf*)

Significance:  Jun 24, 2008

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Correct a Condition Adverse to Quality for Diesel Generator Jacket Water O-Rings

A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified after the licensee failed to promptly correct leakage from diesel generator jacket water o-rings. On February 20, 2008, during a normal surveillance run of Emergency Diesel Generator B, Callaway operations personnel identified an approximately 80 drops per minute jacket water leak caused by premature failure of Nitrile type o-rings.

Following restoration of Emergency Diesel Generator B, the licensee re-evaluated the preventative maintenance frequency for jacket water o-ring replacement and reduced the replacement frequency from once every three years to once every refueling cycle. Then, on May 28, 2008, during a routine surveillance run of Emergency Diesel Generator A, Callaway operations personnel identified that Emergency Diesel Generator A had a 200 drops per minute jacket water leak. Similar to the condition observed on Emergency Diesel Generator B on February 20, 2008, the source of the leakage was from Nitrile type o-rings within the jacket water system. The o-rings responsible for jacket water leakage were found to be of similar age to those that failed during the February 20, 2008 surveillance but had not been replaced despite the change to the licensee's preventive maintenance frequency.

This finding, failure to implement adequate corrective actions for degraded Nitrile type o-rings in Emergency Diesel Generator A after previously identifying the adverse condition on Emergency Diesel Generator B, is more than minor because, if left uncorrected, degraded diesel generator jacket water o-rings could become a more significant safety concern. This finding affected the mitigating systems cornerstone. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding was determined to be of very low safety significance because it was a design deficiency confirmed not to result in loss of operability. This finding has a crosscutting aspect in the area of human performance associated with the work controls component because the licensee failed to plan work activities to support long-term equipment reliability by addressing known degraded conditions in a more reactive than preventative manner [H.3(b)].

Inspection Report# : [2008003](#) (*pdf*)



Significance: Jun 24, 2008

Identified By: NRC

Item Type: VIO Violation

Failure to Prevent Recurrence of Voids in Emergency Core Cooling System Cold Leg Recirculation Piping

The inspectors identified a violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," because the licensee failed to restore compliance within a reasonable time by establishing measures to prevent void formation in emergency core cooling system suction piping for the Train A safety injection system. On May 21, 2008, Callaway Plant engineering performed ultrasonic inspection of the safety injection system common suction piping Line EM-023 HCB - 6" and discovered a 6.6 cubic foot voided area. This exceeded the allowable void fraction of 2.1 cubic feet required for operability. This voided piping, determined to have existed for over a year, was caused by relief valve maintenance on Valve EM8858A (May 7, 2007). The maintenance restoration failed to perform a fill and vent to ensure the suction pipe was full of water. The inspectors identified several related examples where the licensee had performed either inadequate operating experience evaluations, inadequate extent of condition reviews, or inadequate procedure corrections.

This finding, failure to restore compliance to prevent recurrence of emergency core cooling system voids was more than minor because it is similar to Example 3e of NRC Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," criteria because the failure impacted the ability of the emergency core cooling system to function upon initiation of high-pressure recirculation. Using the Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," the inspectors determined that this finding should be evaluated using the Phase 2 process described in Manual Chapter 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations." As described in Section III, of Appendix A, given that the presolved table did not contain a suitable target or surrogate for this finding, the senior reactor analyst used the risk-informed notebook to evaluate the significance of this finding as very low risk significance (Green). This finding has a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program component because AmerenUE failed to thoroughly evaluate voiding problems such that the resolutions addressed causes and extent of condition, as necessary [P.1(c)].

Inspection Report# : [2008005](#) (*pdf*)

Inspection Report# : [2008003](#) (*pdf*)

G**Significance:** Dec 31, 2008

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Inadequate maintenance procedure resulted in residual heat removal mechanical seal failure

The inspectors identified a self-revealing noncited violation of Technical Specification 5.4.1a, "Procedures," for inadequate procedural guidance that resulted in the failure of the residual heat removal Train A pump mechanical seal. On October 22, 2008, the licensee discovered a solid stream of water issuing from the residual heat removal Train A pump mechanical seal. The failure occurred because of installation difficulties encountered on October 8, 2008, when the seal sleeve was installed with the seal locking collar engaged. This configuration resulted in increased loading on the seal seating surfaces that resulted in surface chipping and led to seal failure after approximately 48 hours of shutdown cooling operation. Mechanical seal replacement Procedure MPM EJ QP001, "Residual Heat Removal Pump Overhaul," did not specify that the seal sleeve needed to be installed prior to installing the seal-locking collar. Additionally, the installation procedure did not specify any post-installation acceptance criteria to ensure the seal is properly seated. An analysis of the seal failure determined that leakage would not exceed the 2 gallon per minute Technical Specification limit but would exceed the 1 gallon per minute administrative limit for emergency core cooling system leakage outside containment.

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 radio nuclide releases caused by accidents or releases. Using Manual Chapter 0609, Appendix H, "Containment Integrity Significance Determination Process," this finding was determined to be a Type B finding since it was related to a degraded condition that has potentially important implications for the integrity of the containment, without affecting the likelihood of core damage. This finding was found to be of very low safety significance since the 2 gallon per minute limit assumed in the post accident dose calculation was preserved and therefore the degraded condition would have no impact on large early release frequency. This issue was entered into the licensee's corrective action program as Callaway Action Request 200810933. This finding did not have a crosscutting aspect since it was not a performance deficiency indicative of current licensee performance.

Inspection Report# : [2008005](#) (*pdf*)**G****Significance:** Dec 31, 2008

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to terminate refueling water storage tank recirculation results in inadvertent loss of spent fuel pool inventory

The inspectors identified a self-revealing noncited violation of Technical Specification 5.4.1a, "Procedures," for the failure to close Valve BNV0002 during a fill of the spent fuel pool resulting in approximately 2000 gallons of water being inadvertently transferred from the spent fuel pool to the refueling water storage tank. On November 7, 2008, Procedure OTN EC 00001 was performed to add makeup water to the spent fuel pool. Prior to performing the evolution, operations briefed that the refueling water storage tank was on recirculation and that this alignment needed to be secured prior to performing a fill of the spent fuel pool. Following termination of the refueling water storage tank recirculation lineup and after a fill of the spent fuel pool was initiated, the control room received annunciator "RWST Lev HILO." The crew recognized that an inadvertent transfer of spent fuel pool water to the refueling water storage tank was in progress and directed that Valves ECV0076 and BNV0002 be closed. It was later discovered that poor communication between operators on the status of Valve BNV0002 resulted in the refueling water storage tank remaining on recirculation during the fill operation.

This finding is more than minor because it was associated with the Barrier Integrity cornerstone attribute of human performance and affects the associated cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radio nuclide releases caused by accidents or releases. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding was determined to be of very low safety significance because it only represents a degradation of the radiological barrier function provided by the spent fuel pool. This issue was entered into the licensee's corrective action program as Callaway Action Request 200811692. This finding had a crosscutting aspect in the area of human performance associated with the work control component

because operations personnel failed to effectively communicate work status to the control room.

Inspection Report# : [2008005](#) (*pdf*)

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Significance: Sep 24, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Implement Boric Acid Corrosion Control Procedures

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for failure to perform a corrosion evaluation of boric acid leakage from containment spray Valve ENHV0006 in accordance with Procedure EDP ZZ 01004, "Boric Acid Corrosion Control Program." On August 29, 2008, the resident inspectors identified an active packing leak on Valve ENHV0006 with impact to carbon steel components on the valve as evident by discolored, brown boron. The leak, which had been active since February 27, 2007, was caused by a stem imperfection that was previously identified on December 5, 2007. The inspectors noted that Valve ENHV0006 did not have a current boric acid corrosion evaluation despite meeting the screening requirements for an evaluation listed in Procedure EDP ZZ 01004, "Boric Acid Corrosion Control Program," Section 4.2. Programmatic boric acid control and work control issues were a key contributor to not recognizing the need for an updated boric acid corrosion evaluation.

This finding is more than minor because, if left uncorrected, the failure to analyze the effects of boric acid corrosion on safety related components could become a more significant safety concern. This finding affected the barrier integrity cornerstone. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding was determined be of very low safety significance because the finding does not represent a degradation of the barrier function of the control room against smoke or toxic atmosphere, does not represent an actual open pathway in the physical integrity of the reactor containment, and does not involve an actual reduction in function of hydrogen ignitors in the reactor containment. This issue was entered into the licensee's corrective action program as Callaway Action Request 200809351. This finding has a crosscutting aspect in the area of human performance associated with the work control component because the licensee failed to interdepartmentally coordinate the impact of changes to the work scope for Valve ENHV0006 such that appropriate personnel could perform the necessary evaluations to assure plant performance.

Inspection Report# : [2008004](#) (*pdf*)

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Significance: Jun 24, 2008

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Ensure the Suitability of the Design of the Containment Air Cooler Control Circuitry

A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was identified after determining that the licensee had not adequately selected and reviewed the suitability of the design of the containment air cooler control circuitry. On March 26, 2008, containment air Cooler A fan shut down when shifted from fast to slow speed. Troubleshooting by the licensee determined that voltage was lost to the control power circuitry when the fast speed thermal overload tripped. Since the overload contacts were wired in series, containment air Cooler A experienced a complete loss of control power rendering it inoperable. The licensee determined the trip to be caused by operation of containment air coolers in fast speed, during a period of higher than normal containment pressure. The licensee analyzed the potential impact of the newly discovered adverse containment cooler design vulnerability against design basis accident scenarios. The licensee determined that a hot zero power main steam line break results in a delayed safety injection signal allowing the fan motor overloads to trip prior to being shed by the load sequencer. The containment air coolers would then experience a complete loss of control power and would not be capable of automatically restarting in slow speed. The analysis revealed that the peak containment pressure limit of 48.1 psig would be preserved. The licensee submitted a Licensee Event Report as required by 10 CFR 50.73 since the inadequate containment air cooler control circuitry resulted in a condition prohibited by the plant's Technical Specifications.

This finding, failure to ensure the design of the containment air cooler control circuitry was suitable for all plant conditions, was more than minor because it was associated with the barrier integrity cornerstone attribute of design

control and affects the associated cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radio nuclide releases caused by accidents or releases. Using Manual Chapter 0609 Appendix H, "Containment Integrity Significance Determination Process," this finding was determined to be a Type B finding since it was related to a degraded condition that has potentially important implications for the integrity of the containment, without affecting the likelihood of core damage. This finding was found to be of very low safety significance since containment coolers are structures, systems or components that have no impact on large early release frequency. The inspectors determined that this finding does not have a crosscutting aspect associated with it since the performance deficiency was not indicative of current licensee performance.

Inspection Report# : [2008003](#) (pdf)

Significance:  Jun 24, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Maintain an Adequate Technical Specification Bases Change Process

The inspectors identified a noncited violation of Technical Specification 5.4.1.a, "Procedures," after Callaway control room operators improperly entered a wrong Technical Specification action statement due to the failure to maintain the Technical Specification Bases current. On June 17, 2008, during surveillance testing, Valve EMHV8823 failed to indicate fully closed. Since EMHV8823 is an isolation valve for containment Penetration 49, the licensee entered Technical Specification 3.6.3, "Containment Isolation Valves," Condition C, with an action to restore the valve to an operable status or isolate the penetration within 72 hours. Approximately 8 hours after valve EMHV8823 had been declared inoperable, Callaway licensing personnel contacted the control room and informed them of an approved Technical Specification Bases change that did not allow Technical Specification 3.6.3 Condition C to be applicable to containment Penetration 49. The Technical Specification Bases change was effective May 1, 2008 but had not been issued to the control room. The licensee determined that the more restrictive Technical Specification 3.6.3, Condition A, should have been entered with an action to isolate the affected penetration within 4 hours. The licensee performed a containment entry following discovery of entry into Technical Specification 3.6.3, Condition A and found that Valve EMHV8823 failed its surveillance due to out of adjustment position indicator limit switches. The valve was verified closed and isolated allowing exit from Technical Specification 3.6.3, Condition A.

This finding, failure to ensure the Technical Specification Bases were maintained current and available to the Callaway control room staff, is more than minor because if left uncorrected, the failure to maintain the Technical Specification Bases current could become a more significant safety concern. This finding was determined to affect the barrier integrity cornerstone. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding is determined to be of very low safety significance since this finding did not represent an actual open pathway in the physical integrity of reactor containment and did not involve an actual reduction in function of hydrogen igniters in the reactor containment. This finding has a crosscutting aspect in the area of human performance associated with the decision making component because the licensee failed to communicate, in a timely manner, decisions to personnel who have a need to know the information in order to perform work safely [H.1(c)].

Inspection Report# : [2008003](#) (pdf)

Emergency Preparedness

Occupational Radiation Safety

Significance:  Dec 31, 2008

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to comply with high radiation area entry requirements.

The inspectors reviewed a self-revealing, noncited violation of Technical Specification 5.7.1, which resulted from a failure of three individuals to comply with high radiation area entry requirements. Specifically, on October 20, 2008, three engineers touring the reactor building entered a posted high radiation area without signing in on a radiation work permit which allowed entry into a high radiation area, and did not receive a briefing on dose rates in the high radiation area. Shortly after entering the high radiation area, one of the engineers received an electronic dosimeter rate alarm when dose rates in the area exceeded the 50 millirem per hour setpoint. The licensee entered this event into their corrective action program and conducted an Event Review Team meeting to determine the probable causes that led to the event and recommend corrective actions to prevent the event from happening in the future.

Failure to comply with high radiation area entry requirements is a performance deficiency. This finding is greater than minor because it was associated with the cornerstone attribute of exposure control and affected the cornerstone objective, in that, the failure to meet high radiation area entry requirements increases the potential for increased radiation dose. This finding involved an individual workers' unplanned, unintended dose or potential of such dose (resulting from actions or conditions contrary to Technical Specifications) which could have been significantly greater as a result of a single minor, reasonable alteration of the circumstances. Using the Occupational Radiation Safety Significance Determination Process, the inspectors determined the finding to have very low safety significance because (1) it was not associated with ALARA planning or work controls, (2) there was no overexposure, (3) there was no substantial potential for an overexposure, and (4) the ability to assess dose was not compromised. Additionally, the finding had a crosscutting aspect in the area of human performance, work practices component, because the workers failed to use error prevention tools such as self- and peer-checking.
Inspection Report# : [2008005](#) (*pdf*)

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 : June 05, 2009