

## Callaway

# 2Q/2006 Plant Inspection Findings

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### Initiating Events

**G****Significance:** Jun 23, 2006

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

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

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

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

Inspection Report# : [2006003\(pdf\)](#)

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### Mitigating Systems

**G****Significance:** Jun 23, 2006

Identified By: Self-Revealing

Item Type: FIN Finding

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

A self-revealing finding was identified after an inadequate switchyard maintenance procedure resulted in the loss of power to a safety-related bus. On June 6, 2006, off-site power was lost to a plant safety-related bus when electricians restored the "breaker failure" relay for a main switchyard breaker. The emergency diesel generator automatically started and restored power to the bus. The inspectors identified AmerenUE did not use applicable operational experience prior to conducting the work. NRC Information Notice 1991-81, "Switchyard Problems that Contribute to Loss of Offsite Power," and an AmerenUE operational experience, "Lessons Learned Switchyard Activity Checklist," addressed similar conditions. This issue was entered into the corrective action program as Callaway Action Request 200604492.

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

Inspection Report# : [2006003\(pdf\)](#)

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**G****Significance:** Apr 14, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Recognize and Correct Inadequate Emergency Procedures**

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for the failure to take adequate corrective action to prevent recurrence of a significant condition adverse to quality. Specifically, AmerenUE failed to correct the Emergency Operating Procedure deficiencies associated with Final Safety Analysis Report requirements following an April 15, 1998 notification of the same deficiencies at another standardized nuclear unit power plant system plant. At that time AmerenUE did not identify and correct similar deficiencies involving the component cooling water system support function for residual heat removal heat exchangers. The Emergency Operating Procedure deficiencies were discovered by plant personnel on March 27, 2006, during a simulator exercise involving the transition to the emergency core cooling system recirculation phase. Problem identification and resolution crosscutting aspects were identified for the failure to adequately identify and correct Emergency Operating Procedures deficiencies to ensure operation within the design basis.

This issue was more than minor because it affected the Mitigating Systems cornerstone objective of equipment reliability. The failure to provide for component cooling water system flow through the residual heat removal heat exchangers for initial containment recirculation could result in a loss of the component cooling water system and thus become a much more significant safety concern. AmerenUE's evaluation of the condition was considered for the time allowable to establish component cooling water flow before a loss of the component cooling water system would occur. AmerenUE provided an evaluation that demonstrated a loss of component cooling water would not occur based on the timing of operator actions. Because the timing did affect the probabilistic risk assessment for human reliability, a Phase 3 risk assessment was performed by an NRC senior reactor analyst. The analyst determined that the finding was of very low safety significance, Green. AmerenUE entered this issue into their corrective action program as Callaway Action Request 200602565.

Inspection Report# : [2006011\(pdf\)](#)



**Significance:** Apr 14, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

**Inadequate Corrective Actions Result in Possible CCW Runout Conditions**

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for AmerenUE's failure to implement appropriate corrective actions for maintaining component cooling water flow consistent with design basis requirements. On April 11 and 12, 2006, AmerenUE placed the Train A component cooling water system in a configuration which could result in component cooling water pump runout in the event of a loss-of-coolant accident coincident with a loss of offsite power. Crosscutting aspects associated with problem identification and resolution were identified for the failure to implement appropriate corrective actions to ensure the component cooling water system remained operable for other design basis events.

This issue was more than minor because it affected the Mitigating Systems cornerstone objective of equipment reliability in that a loss of one train of the component cooling water system could cause other mitigating equipment (i.e., pumps and heat exchangers) to fail and thus become a much more significant safety concern. Using the NRC Inspection Manual Chapter 0609, Significance Determination Process, Phase 1 Screening Worksheet, the finding was determined to be of very low safety significance because it did not result in a loss of safety function for a single train for greater than its Technical Specification allowed outage time. AmerenUE entered this issue into its corrective action program as Callaway Action Request 200602995.

Inspection Report# : [2006011\(pdf\)](#)



**Significance:** Mar 24, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

**Inadequate Evaluation of Degraded Plant Equipment**

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," after the licensee failed to promptly identify, evaluate, and correct a degraded control building air conditioning unit compressor. The compressor developed a hole in one of the cylinder head discharge reed valves. The hole allowed the bypass of hot discharge gases and rendered the compressor incapable of completing the safety function for the specified mission time. The hole was caused by cyclic fatigue stress. This issue was entered into the corrective action program as Callaway Action Request 200601177. This finding is associated with the crosscutting area of problem identification and resolution because the issue involved the failure of operations personnel to adequately evaluate degraded plant equipment.

This finding is greater than minor because, if left uncorrected, the degradation would have worsened and become a more significant safety concern. This finding was a qualification deficiency that resulted in loss of operability per "Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment." However, the finding is of very low safety significance because it did not represent a loss of system safety function, did not represent an actual loss of safety function for a single train for greater than the 30-day Technical Specification allowed outage time, did not represent an actual loss of safety function of one or more non-Technical Specification trains of equipment designated as risk-significant per 10 CFR 50.65, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

Inspection Report# : [2006002\(pdf\)](#)



**Significance:** Dec 31, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

**Minimum gap size exceeded for containment recirculation sump.**

The inspectors identified a noncited violation of 10 CFR Part 50, Criterion X, after plant quality control personnel performed an inadequate inspection of an emergency core cooling system containment recirculation sump. The inspection failed to identify a 1½-inch hole which provided a path for foreign material into the containment sump which could affect the recirculation mode of emergency core cooling system operation. AmerenUE completed a detailed inspection of the sump on April 27, 2004 in response to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," but failed to identify the 1½ -inch hole. This issue was entered into the corrective action program as Callaway Action Request 200509189.

This finding is greater than minor because it is associated with the mitigating systems cornerstone attribute of equipment performance and affects the associated cornerstone objective to ensure availability and reliability of the containment recirculation sump emergency core cooling system containment safety function. This finding is of very low safety significance because the condition was a qualification deficiency confirmed not to result in loss of function per Part 9900, Technical Assessment; "Operability Determination Process for Operability and Functional Assessment." The

cause of this finding, poor attention to detail by personnel, is related to the crosscutting element of human performance.

Inspection Report# : [2005005\(pdf\)](#)

**G**

**Significance:** Dec 31, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to adequately implement continuous compensatory fire watches.**

The inspectors identified a noncited violation of Technical Specification 5.4.1, "Procedures," associated with seven examples of inadequately performed continuous fire watches. In September 2005, AmerenUE provided verbal guidance to fire watch personnel that continuous watches may be met by a 15 minute roving fire patrol. The roving patrol did not ensure adequate compensatory action for fire areas with degraded detection or suppression capability. As a result, fire watch personnel were not available to promptly detect, report, and extinguish a fire while still in the incipient stage. AmerenUE did not evaluate this change to ensure no adverse affect on the ability to achieve and maintain safe shutdown in the event a fire was created. The condition was entered into the corrective action program as Callaway Action Request 200510325. The cause of this finding is related to the crosscutting element of human performance because the resources needed to support the task, including complete and accurate procedures and supervision, were less than adequate.

This finding is greater than minor because inadequate fire watches are associated with the reactor safety mitigating systems cornerstone attribute to provide protection against external factors and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. This finding is of very low safety significance because the condition had an adverse affect on the "Fixed Fire Protection Systems" element of fire watches posted as a compensatory measure for outages or degradations. A low degradation rating was assigned to this finding as the provision affected by this finding is expected to display nearly the same level of effectiveness and reliability.

Inspection Report# : [2005005\(pdf\)](#)

**G**

**Significance:** Dec 31, 2005

Identified By: NRC

Item Type: FIN Finding

**Failure to Conduct Simulator Testing in Accordance with ANSI/ANS 3.5-1998**

The inspectors determined that the failure to adhere to ANSI/ANS 3.5-1998, as endorsed by Regulatory Guide 1.149 "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," Revision 3, October 2001, as committed to in the Callaway Plant Simulation certification dated March 13, 2000, was a finding. Specifically, the simulator performance testing did not meet the standards specified in ANSI/ANS 3.5-1998, in that: (1) all required parameters during the simulator test were not recorded; and (2) simulator to baseline data comparisons were unavailable.

The failure to evaluate and document simulator performance testing is more than minor because it affected the Operator Requalification attribute of the Mitigating Systems and Initiating Event cornerstone of reactor safety and is inconsistent with the requirements of 10 CFR 55.46 in that simulator fidelity issues may not be identified, which have the potential of causing negative training. The finding was considered to be of very low safety significance because the discrepancies have not yet impacted operator actions in the plant, such that, safety-related equipment was made inoperable or that operators failed to properly respond to plant transients.

Inspection Report# : [2005005\(pdf\)](#)

**G**

**Significance:** Dec 31, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

**Use of a Non-Qualified Calculation in a Safety Related Modification**

The inspectors identified a noncited violation of 10 CFR 50, Appendix B, Criteria V, "Instructions, Procedures, and Drawings," associated with an inadequate engineering procedure used for the verification of design calculations. The inadequate procedure resulted in a non-qualified, non-safety-related engineering calculation being used to demonstrate that the safety-related containment recirculation sump valves were capable of performing the safety function described in the design bases. The performance deficiency associated with this finding involved the failure of engineering personnel to only use qualified calculations for safety-related applications. The cause of this finding is related to the crosscutting element of human performance because insufficient resources were provided to ensure complete and accurate procedures to support task performance. This finding was entered into the Corrective Action Program as Callaway Action Request 200509849.

This finding is greater than minor because if left uncorrected, this finding would become a more significant safety concern. This finding is determined to have very low safety significance because this issue involves a design deficiency confirmed not to result in loss of operability per Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessment."

Inspection Report# : [2005005\(pdf\)](#)

**G**

**Significance:** Sep 23, 2005

Identified By: Self-Revealing  
Item Type: NCV NonCited Violation

**Degraded auxiliary feedwater pump due to the failure to follow procedure.**

A self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," was identified after AmerenUE failed to properly align the turbine driven auxiliary feedwater pump mechanical overspeed trip mechanism after surveillance testing. The trip mechanism was misaligned from August 1 - 18, 2005. The misaligned trip mechanism increased the probability the turbine would trip if the pump would have been required to respond to an event. This issue was entered into the corrective action program as Callaway Action Request 200505801. This finding, which involved the failure of an operator to follow procedure, was associated with the crosscutting area of human performance.

This finding is greater than minor because the degraded trip mechanism affected the reactor mitigating systems cornerstone and the equipment performance attribute to ensure availability of systems that respond to prevent core damage. This finding is only of very low safety significance because the condition was not a design or qualification deficiency confirmed to result in loss of function per Generic Letter 91-18; did not result in an actual loss of safety function of a system; did not increase the likelihood of a fire; and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

Inspection Report# : [2005004\(pdf\)](#)

## Barrier Integrity

**Significance:**  Jun 23, 2006

Identified By: NRC  
Item Type: NCV NonCited Violation

**Less Than Adequate Evaluation of Containment Heat Exchanger Postmodification Tests Results and self Assessment Recommendations**

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

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

Inspection Report# : [2006003\(pdf\)](#)

**Significance:**  Jun 23, 2006

Identified By: NRC  
Item Type: NCV NonCited Violation

**Less Than Adequate Evaluation of Containment Heat Exchanger Performance Monitoring Requirements**

The inspectors identified a noncited violation of Technical Specification 3.6.6, "Containment Spray and Cooling Systems," after AmerenUE failed to perform Surveillance Requirement 3.6.6.7 to verify minimum cooling water was provided to each containment cooling train between October 23, 2002, and June 26, 2006. Technical Specification Bases, Figure 3.6.6.7-1, "Containment Cooler Heat Removal Minimum Cooling Flow Rates," provided an "acceptable region" for reduced service water flow as a function of the available fraction of rated heat exchanger heat removal capacity. The "acceptable region" ensured sufficient duty to remove the required containment heat loads during accident conditions. AmerenUE had not performed adequate testing to determine the containment heat exchanger available percent of rated capacity. This issue was entered into the corrective action program as Callaway Action Request 200605143.

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

Inspection Report# : [2006003\(pdf\)](#)

**Significance:**  Jun 23, 2006  
Identified By: NRC

Item Type: NCV NonCited Violation

### **Less than adequate Operability Determination of a Degraded Containment Heat Exchanger**

The inspectors identified a noncited violation of Technical Specification 3.6.6, "Containment Spray and Cooling Systems," after AmerenUE failed to perform Surveillance Requirement 3.6.6.7 to verify minimum cooling water was provided to each containment cooling train between October 23, 2002, and June 26, 2006. Technical Specification Bases, Figure 3.6.6.7-1, "Containment Cooler Heat Removal Minimum Cooling Flow Rates," provided an "acceptable region" for reduced service water flow as a function of the available fraction of rated heat exchanger heat removal capacity. The "acceptable region" ensured sufficient duty to remove the required containment heat loads during accident conditions. AmerenUE had not performed adequate testing to determine the containment heat exchanger available percent of rated capacity. This issue was entered into the corrective action program as Callaway Action Request 200605143.

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

Inspection Report# : [2006003\(pdf\)](#)



**Significance:** Dec 31, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Follow Procedures Resulted in Violation of RCS Cooldown and Heatup Rate Limits.**

The inspectors identified a noncited violation of Technical Specification 5.4.1.a, "Procedures," after AmerenUE Operations personnel failed to maintain the reactor coolant system temperature limits on two occasions. On November 7, 2005, plant operators decreased the reactor coolant system pressurizer surge line temperature 260 degrees Fahrenheit in a one-hour period. The operators conducted the rapid cooldown after several containment lead shield blanket polyvinylchloride covers left in containment melted. On November 8, 2005, plant operators increased the surge line temperature about 175 degrees Fahrenheit in a one-hour period. Plant Technical Specification 3.4.3, "RCS Pressure and Temperature (P/T) Limits," and Plant procedures required reactor coolant system component temperature changes (except the pressurizer) be limited to 100 degrees in one hour. The cause of this finding is related to the crosscutting element of human performance because of personnel failure to follow procedures.

This finding was greater than minor because it is associated with the reactor safety barrier integrity cornerstone attribute of equipment performance and affects the associated cornerstone objective to ensure reasonable assurance that the reactor coolant system piping barrier will protect the public from radionuclide releases caused by accidents or events. This finding is determined to have very low safety significance because an engineering evaluation concluded that the temperature transient did not significantly increase the likelihood of a loss of reactor coolant system inventory or degrade the ability to terminate a leak path. This finding was placed in the Corrective Action Program as Callaway Action Requests 200509487 and 200509143.

Inspection Report# : [2005005\(pdf\)](#)



**Significance:** Sep 23, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

### **Ineffective corrective actions resulted in degraded control building habitability boundary.**

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, "Corrective Action," after ineffective corrective actions resulted in a repeat degradation of a control building emergency ventilation habitability boundary door. AmerenUE's work control organization twice authorized work on the essential switchgear room to emergency diesel generator room door without approval of the shift operations department. As a result, shift operations did not understand that the habitability boundary had been compromised by the maintenance. This finding, which involved ineffective corrective actions to prevent the repeat degradation of the ventilation system habitability boundary door, was associated with the crosscutting area of problem identification and resolution.

This finding was greater than minor because it was associated with the integrity of the control building pressure envelope in that the degraded door would not meet its habitability function. The finding was only of very low safety significance because the finding only represented a degradation of the radiological barrier function provided for the control room.

Inspection Report# : [2005004\(pdf\)](#)

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## **Emergency Preparedness**

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## Occupational Radiation Safety

**G****Significance:** Oct 21, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

**Failure to control a high radiation area with dose rates greater than 1.0 rem per hour.**

The inspector reviewed a self-revealing non-cited violation of Technical Specification 5.7.2 because the licensee failed to control a high radiation area with dose rates greater than 1.0 rem per hour. Specifically, on September 26, 2005, the reactor vessel head was moved from the head stand and placed back on the reactor vessel without the proper radiological controls in place for a high radiation area with dose rates as high as 6.0 rem per hour. A loud noise created by the falling of a locking device on the reactor head alerted radiation protection personnel that the head lift had begun prematurely. The licensee's immediate corrective actions were to ensure that individuals were not present in the high radiation area and to place the reactor head in a safe condition on the reactor vessel. The finding was entered into the licensee's corrective action program as Callaway Action Request 200507546.

The failure to control a high radiation area with dose rates greater than 1.0 rem per hour is a performance deficiency. The finding was greater than minor because it was associated with the Occupational Radiation Safety Cornerstone attribute of program and process and affected the cornerstone objective to ensure the adequate protection of a worker's health and safety from exposure to radiation. The finding involved the potential for a worker's unplanned or unintended dose resulting from actions contrary to technical specifications. When processed through the Occupational Radiation Safety Significance Determination Process, the finding was determined to be of very low safety significance because the finding did not involve ALARA planning or work controls, there was no overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised. In addition, this finding has crosscutting aspects associated with human performance because poor coordination and communication between the head lift crew and radiation protection personnel directly contributed to the finding.

Inspection Report# : [2005009\(pdf\)](#)

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## Public Radiation Safety

## Physical Protection

[Physical Protection](#) information not publicly available.

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## Miscellaneous

**G****Significance:** Dec 31, 2005

Identified By: NRC

Item Type: FIN Finding

**Less Than Adequate Spent Fuel Pool Water Inventory Risk Controls**

The inspectors identified a finding after AmerenUE implemented less than adequate risk management controls of the spent fuel pool water inventory. On September 29, 2005, the core had been off-loaded to the spent fuel pool and the transfer canal weir was removed. The spent fuel pool temperature was 99 degrees Fahrenheit with a 12.1 hour time-to-boil. Transfer tube Valve ECV-995 isolated the fuel transfer canal from the containment cavity. In this configuration, the tube valve could provide a drain path reducing water level from 25 feet to less than 2 feet above the spent fuel. Valve ECV-995 was closed but was not identified in the shutdown risk management system and did not have administrative controls to protect against misalignment. NRC Information Notice 2005-16, "Outage Planning and Scheduling - Impacts on Risk," emphasized that most spent fuel pool events had a common thread of human error and involved equipment misalignment. This finding was entered into the Corrective Action Program as Callaway Action Requests 200507593 and 200507693.

This finding is greater than minor because if left uncorrected, it would have become a more significant safety concern. Because Manual Chapter 0609, "Significance Determination Process," does not specifically address findings related to the spent fuel pool inventory, this finding is determined to have very low safety significance based on NRC management review with input from senior reactor analysts. No violation of regulatory requirements occurred.

Inspection Report# : [2005005\(pdf\)](#)

Last modified : August 25, 2006