



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

April 21, 2008

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SUBJECT: CALLAWAY PLANT - NRC PROBLEM IDENTIFICATION AND RESOLUTION  
INSPECTION REPORT 05000483/2008006

Dear Mr. Naslund:

On March 14, 2008, the U. S. Nuclear Regulatory Commission completed a team inspection at your Callaway Plant. The enclosed report documents the inspection findings, which the team discussed on March 14, 2008, with Mr. A. Heflin, Vice President – Nuclear, and other members of your staff during the exit meeting.

The team examined activities conducted under your license as they relate to the identification and resolution of problems, compliance with the Commission's rules and regulations, and the conditions of your operating license. Within these areas, the inspection involved examination of selected procedures and representative records, observations of activities, and interviews with personnel. The team reviewed 246 Callaway Action Requests, associated root and apparent cause evaluations, and other supporting documents. The team reviewed an additional 124 Callaway Action Requests related to specific areas - essential service water, component cooling water, 480 Vac auxiliary contacts, and safety conscious work environment. The team reviewed cross-cutting aspects of NRC findings and interviewed personnel regarding the condition of your safety conscious work environment at the Callaway Plant.

Based on the sample selected for review, the team concluded that your staff continued to have challenges in the area of prioritization and evaluation, which need additional attention. The team also noted that performance related to problem identification and resolution had improved. The team determined that you're your staff had used the self-assessment process and quality assurance organization to improve site performance. The team determined the improvement resulted from corrective action process improvements implemented in January 2007, and management oversight process changes implemented following receipt of substantive cross-cutting issue in problem identification and resolution.

Because of the increased number of allegations at your facility in Calendar Year 2007, especially the discrimination concerns, the team interviewed a large number of personnel related to the safety conscious work environment at the Callaway Plant. In addition, because of the nature of the concerns expressed in the allegations, the team asked additional questions to gain insights into the safety conscious work environment at your facility. The team documented the nature of the concerns and the scope of the evaluations in Attachment 3. The team determined that not all individuals were comfortable using all of the methods available to them for reporting concerns; however, all personnel interviewed stated that they would have used at least one of the methods

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available for reporting a safety concern. The team determined that our review results remained consistent with other safety culture surveys that you had completed within the last year. The team determined that some general culture and work environment issues continued to be present that were outside NRC regulatory jurisdiction, which if not addressed could potentially affect the safety conscious work environment at the Callaway Plant.

The team identified one finding for failure to determine whether you had a non-conservative technical specification surveillance requirement. The team attributed this to improper processing of operating experience. This finding violated NRC requirements. However, because of the finding had very low safety significance and because the finding had been entered into your corrective action program, the NRC is treating this findings as a noncited violation, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. In addition, one licensee-identified violation of very low safety significance is listed in this report. If you contest the violations or the significance of the violations, you should provide a response within 30 days of the date of this inspection report. Include the basis for your denial, to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, U. S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas, 76011; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Callaway Plant.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

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License: NPF-30

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**ENCLOSURE**

**U. S. NUCLEAR REGULATORY COMMISSION  
REGION IV**

Docket: 50-483  
License: NPF-30  
Report Number: 05000483/2008006  
Licensee: AmerenUE  
Facility: Callaway Plant  
Location: Junction Highway CC and Highway O  
Fulton, Missouri  
Dates: February 11 – 15, and March 10 – 14, 2008  
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## SUMMARY OF ISSUES

IR 05000483/2008006; 2/11/2008 - 3/14/2008; Callaway Plant; Biennial inspection of the identification and resolution of problems

One senior reactor inspector, one senior project engineer, three reactor inspectors, and a resident inspector conducted the inspection. The team identified one noncited violation during this inspection. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the Significance Determination Process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

### Identification and Resolution of Problems

The team reviewed 246 Callaway Action Requests, several job orders, engineering evaluations, associated root and apparent cause evaluations, and other supporting documentation to assess problem identification and resolution activities. The team reviewed an additional 124 Callaway Action Requests related to specific areas - essential service water, component cooling water, 480 Vac auxiliary contacts and safety conscious work environment. Based on the sample selected for review, the team concluded the licensee continued to have challenges in the area of prioritization and evaluation, which require additional effort. The team also noted that licensee performance related to problem identification and resolution had improved. The team determined the licensee had used the self-assessment process and quality assurance organization to improve site performance. The team determined the improvement resulted from corrective action process improvements implemented in January 2007, and management oversight changes implemented following receipt of substantive cross-cutting issue in problem identification and resolution.

The team determined that the licensee had initiated actions that improved the quality of their operability assessments, operational decision-making, and knowledge of the detailed design and licensing basis since the last evaluation. The graduated approach to assigning cause evaluations for conditions adverse to quality and the change that required the Callaway Action Request screening committee to review all Callaway Action Requests provided increased assurance in the ability of the licensee to identify and effectively resolve conditions adverse to quality.

The team determined that the licensee properly evaluated industry operating experience when performing root cause and higher tier cause evaluations; however, the licensee had continued challenges effectively evaluating industry operating experience.

The team determined that licensee audits and assessments continued to be detailed, probing, and self-critical. The licensee continued to use benchmarking of industry best practices and third party evaluations that improved the corrective action program performance during this assessment period. The licensee had effectively implemented performance improvements to address the substantive cross-cutting issue (refer to March 2, 2007, End of Cycle letter) related to evaluating actions required for conditions adverse to quality as demonstrated by the decreased number of findings in the latter half of this assessment period and lower affect that poor evaluations had on the facility. However, the licensee will need to apply additional effort to affect improvements. The improving performance resulted from increased management involvement in the corrective action program and in daily activities.

Because of the increased number of allegations at the facility in Calendar Year 2007, including several discrimination concerns, the team interviewed more personnel than normal to assess the safety conscious work environment at the Callaway Plant. The team documented the nature of the concerns and the increased scope of the evaluations in Attachment 3. The team determined that not all individuals were comfortable using all of the methods available to them for reporting concerns; however, all personnel would have used at least one of the methods available for reporting a safety concern. In addition, the team determined that the employee concerns program requires more visibility and that not all personnel had confidence in the employee concerns program. The team determined that our review results remained consistent with other safety culture surveys that Callaway Plant had completed within the last year. The team determined that some general culture and work environment issues continued to be present from the last assessment that were outside NRC regulatory jurisdiction, which if not addressed could potentially affect the safety conscious work environment at the Callaway Plant.

A. Inspector-Identified and Self-Revealing Findings

**Cornerstone: Mitigating Systems**

- Green. The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," because the licensee failed to ensure that Technical Specification Surveillance Requirements for the NK11 and NK14 safety-related batteries established limits that met the design requirements. Specifically, until questioned by the team the licensee failed to determine the required design value needed to assure plant safety as requested in Callaway Action Request 200706561. The licensee determined that 69 micro-ohms should be the actual allowed inter-cell voltage limit to meet the design requirements versus an allowed Technical Specification limit of 150 micro-ohms.

The performance deficiency associated with this finding involved the failure to ensure that the NK11 and NK14 safety-related batteries would remain operable if all the inter-cell connections measured 150 micro-ohms as allowed by Technical Specification Surveillance Requirements 3.8.4.2 and 3.8.4.5. This finding was greater than minor because it was associated with the Mitigating Systems cornerstone attribute of maintenance and testing and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have very low safety significance because it was a design deficiency confirmed not to result in loss of operability. The finding had a cross-cutting aspect in the area of problem identification and resolution associated with operating experience because the licensee failed to evaluate in a timely manner relevant internal and external operating experience P.2(a) (Section 4OA2.e).

B. Licensee-Identified Violations

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

## REPORT DETAILS

### 4 ~~OTHER~~ ACTIVITIES (OA)

#### 4OA2 Identification and Resolution of Problems

The team based the following conclusions, in part, on all issues that the team reviewed during the assessment period, which ranged from November 1, 2006, to March 14, 2008. The team divided the issues into two groups. The first group (current issues) included problems identified during the assessment period where at least one performance deficiency occurred during the assessment period. The second group (historical issues) included issues identified during the assessment period but had performance deficiencies that occurred outside the assessment period.

#### a. Assessment of the Corrective Action Program Effectiveness

##### (1) Inspection Scope

The team reviewed items from across the seven cornerstones to verify that the licensee: (1) identified problems at the proper threshold and entered them into the corrective action system, (2) adequately prioritized and evaluated issues, and (3) established effective and timely corrective actions to prevent recurrence. The team performed field walk downs of the component cooling water system and the 480 Vac breakers to inspect for deficiencies that personnel should have entered into the corrective action program. The team reviewed operator logs and station job orders to ensure personnel entered conditions adverse to quality into the corrective action program. Additionally, the team reviewed a sample of self-assessments, trending reports, system health reports, and various other documents related to the corrective action program.

The team interviewed station personnel, attended screening committee, leadership and Corrective Action Review Board meetings, and evaluated corrective action documentation to determine the threshold for entering problems into their corrective action program. The meetings assisted the team with their assessment of the threshold of prioritization and evaluation of identified issues. The team performed a historical review of Callaway Action Requests written over the last 5 years that addressed the component cooling water system and the 480 Vac breakers.

The team reviewed plant records, primarily Callaway Action Requests and job orders, to verify that the licensee developed and implemented corrective actions for identified problems, including corrective actions to address common cause or generic concerns. The team sampled specific technical issues to evaluate the adequacy of operability determinations.

Additionally, the team reviewed Callaway Action Requests that addressed past NRC-identified and self-identified violations to ensure that the corrective actions addressed the issues as described in the inspection reports. The team reviewed a sample of corrective actions closed to other Callaway Action Requests, job orders, or other processes to ensure that the licensee had appropriately implemented the corrective actions in a timely manner.

(2) Assessments

(a) Assessment - Effectiveness of Problem Identification

The licensee identified deficiencies as conditions adverse to quality and entered them into their corrective action program. From the inspection sample, the team identified only one example for failure to identify excessive nuisance alarms as a condition adverse to quality.

Consequently, the licensee did not resolve the nuisance alarms in a timely manner.

Otherwise, the team determined that the licensee had established an appropriate threshold for identifying adverse conditions. The team determined that the licensee had lowered their identification threshold, which improved their ability to identify conditions adverse to quality during this assessment period. In addition, the team verified that the screening committee evaluated all Callaway Action Requests to ensure that they identified any related adverse condition no matter the Callaway Action Request type (i.e., adverse condition, business tracking, training request, or request for resolution).

In response to the previous inspection, the team verified that the licensee had eliminated Action Notices, which had resulted in violations during the previous inspection for various reasons. The team verified that the licensee had appropriately evaluated open Action Notice Callaway Action Requests to verify whether any adverse conditions required a cause evaluation and more timely corrective actions. The team evaluated and found no instances of a Significance Level 6 Callaway Action Request tracking an adverse condition. The licensee had replaced the Action Notices with the business tracking Significance Level 6 Callaway Action Requests.

The team determined that licensee quarterly trend reports appropriately discussed and tracked resolution of identified trends. The licensee recently initiated actions to lower the threshold for identifying adverse trends so they could better utilize this tool to improve their performance. The team verified that the licensee identified and recognized their adverse trends, which represented improved performance since the last corrective action program inspection.

**Current Issues**

Example: From interviews with security officers, the team determined that audible alarms on a security feature sounded too often and decreased the sensitivity of the officers to monitor the alarms as expected. The team determined that, although the security personnel and the system engineer knew about the issue, no one had initiated a Callaway Action Request documenting the excessive number of nuisance alarms. Officers had verbally reported and sent e-mails to the system engineer who had contacted the vendor and made adjustments, which had reduced the alarms; however, the alarms continued. The team determined that this deficiency was minor since the security feature remained capable of performing its intended function. The licensee documented this deficiency in Callaway Action Request 200801877.

## Historical Issues

Example 1: Licensee personnel failed to initiate Callaway Action Requests for conditions adverse to quality, as required by 10 CFR Part 50, Appendix B, Criterion XVI. Documenting these degraded conditions may have prevented a main steam line water hammer event in June 2006 and may have identified, in August 2005, an additional high point air trap in the Train A safety injection discharge piping that could impact system operability (NRC Inspection Report 05000483/2006012-01).

Example 2: The team considered two Action Notice Callaway Action Requests (200602989 and 200608806), identified during this inspection, as inappropriately classified conditions adverse to quality contrary to 10 CFR Part 50, Appendix B, Criterion V, and their corrective action program (NRC Inspection Report 05000483/2006012-02).

Example 3: The licensee failed to identify three Action Notice Callaway Action Requests as conditions adverse to quality (200603636, 200604166 and 200605466); however, the team determined these examples represented minor findings.

Example 4: During audits from January 2005 through October 9, 2006, the licensee identified 63 Callaway Action Requests that personnel had initiated as action notices rather than conditions adverse to quality. Quality Assurance issued Callaway Action Request 200606131 to document that personnel incorrectly listed six deficiencies as Action Notice Callaway Action Requests instead of conditions adverse to quality. During review of the third quarter audit data, the team identified an additional eight Action Notice Callaway Action Requests that the audit process should have identified. This represented a 33 percent increase. The team confirmed that the licensee had appropriately determined that personnel had misclassified 0.5 percent of the Action Notice Callaway Action Requests; however, the team verified none of the misclassified items documented significant deficiencies.

Example 5: Plant operations and security had several prior opportunities to identify a degraded fire door indicating personnel did not have a low threshold for identifying issues (Inspection Report 05000483/2006005-01).

(b) Assessment - Effectiveness of Prioritization and Evaluation of Issues

The licensee did not always appropriately prioritize and evaluate conditions adverse to quality. The team identified a large number of examples of poor evaluation that indicated additional effort is needed in this area. Specifically, the team determined the licensee had: two examples related to poor prioritization (Examples 1 and 3), two examples resulting from personnel not fully implementing plant processes (Examples 2 and 8), one example of failure to evaluate longstanding design issues (Example 6); and six examples that resulted from ineffective evaluations (Examples 4, 5, 7, 9, 10 and 11). The team verified that the Callaway Action Request screening process resulted in appropriately reassigning the significance level of Callaway Action Requests commensurate with their safety significance (Example 12).

Similar to the last assessment, outside organizations continued to identify that the licensee did not always perform effective evaluations of conditions adverse to quality; consequently, the licensee continued to emphasize and provide management oversight. The licensee had implemented product quality evaluations in Engineering and had developed tools to evaluate,

grade, and provide feedback on the Significance Level 1, Level 2 and selected Level 3 adverse condition Callaway Action Requests.

The team specifically evaluated the corrective actions related to operability evaluations and root cause evaluations, which the last biennial problem identification and resolution inspection identified as deficient areas. The team concluded that the actions taken by the licensee (e.g., reinforced expectations, training of engineers and operators in design and license bases and performance of operability evaluations, and improved tiered root cause evaluation guidance) had improved the quality of operability evaluations. However, the team determined the large number of current examples for failure to adequately evaluate issues indicates the licensee will need to take additional action in this area.

In response to external organization evaluations and as corrective action to the substantive cross-cutting issue related to problem identification and resolution for inadequate evaluations (refer to March 2, 2007, End of Cycle letter), the licensee initiated numerous actions to strengthen the screening committee and other aspects of the corrective action program. A majority of the actions related to reinforcing expected behaviors through coaching.

### **Current Issues**

Example 1: As of December 19, 2007, the licensee had not tested the essential service water, component cooling water and containment spray pumps at 20 percent of full flow. Subsequently, the licensee invoked Surveillance Requirement 3.0.2 and completed the testing within the extended 25 percent surveillance interval. While no violation of requirements resulted, the licensee had not implemented the requirements in a timely manner. The licensee documented this deficiency in Callaway Action Request 200801400.

Example 2: The resident inspectors determined the licensee performed an inadequate post-maintenance test after repairing a damaged trip breaker contact block. Specifically, personnel failed to identify that the contacts affected the P-4 interlock; consequently, the licensee restored the breaker to service without performing a post maintenance test of the P-4 interlock. Although this test failed to meet the requirements of 10 CFR Part 50, Appendix B, Criterion XI, the inspectors determined the violation was minor because the licensee adequately tested the breaker prior to exceeding the Technical Specifications allowed outage time. The licensee documented this deficiency in Callaway Action Request 200800811.

Example 3: Quality assurance auditors documented in Callaway Action Request 200711176 that personnel had not properly re-screened Significance Level 6 Callaway Action Request 200700560 to an adverse condition Significance Level 4 nor was a new adverse condition identified once personnel determined that external operating experience applied to Callaway Plant. The team concluded the deficiency was minor since no identified deficiency resulted from the review.

Example 4: Engineering approved deviating from the established motor-driven auxiliary feedwater pump coupling tolerances provided by the vendor without considering the impact on the thrust bearing (Inspection Report 05000483/2007004-02).

Example 5: The resident inspectors determined that the licensee failed to evaluate the extent of condition for micro-biologically induced corrosion of essential service water piping. Specifically, the licensee failed to perform ultrasonic testing under the American Society of Mechanical Engineers Code identification bands (Inspection Report 05000483/2007003-03).

Example 6: The resident inspectors determined that the licensee failed to evaluate a longstanding ultimate heat sink cooling tower design issue, which resulted in allowing water to flow over the fill below freezing conditions contrary to vendor recommendations (Inspection Report 05000483/2007003-01).

Example 7: The resident inspectors determined that the licensee failed to evaluate micro-biologically induced corrosion of essential service water large-bore piping to ensure the resolutions addressed causes and extent of condition (Inspection Report 05000483/2007002-03).

Example 8: After an operator could not locate a block switch during a surveillance test, the control room supervisor revised the procedure without verifying the correct block switch identifier. Consequently, during the test when the operator defeated the identified (wrong) train block feature, the opposite rain control room ventilation isolated (Inspection Report 05000483/2007002-01).

Example 9: Operations performed an inadequate review to establish compensatory actions of an operator work around, which reflected a failure to thoroughly evaluate a problem to ensure resolutions address causes and extent of condition (Inspection Report 5000483/2006005-05).

Example 10: Engineering failed to thoroughly evaluate residual heat removal relief valve problems to ensure resolutions addressed causes and extent of conditions (Inspection Report 05000483/2006009-06).

Example 11: Callaway Action Request 200801664 described that personnel failed to document an adverse condition that required evaluation. Specifically, after Quality Assurance identified in Audit AP06-003 that the turbine-driven auxiliary feedwater pump exhaust line was not adequately protected from missile hazards, Engineering initiated Request for Resolution 2006006712; however, personnel failed to identify this as a potential non-conforming condition in an adverse condition Callaway Action Request. Additionally, the resident inspectors questioned if the current configuration was consistent with the licensing basis.

Example 12: After reviewing significance level reassignments for Callaway Action Requests that occurred during this assessment period, the team determined that the licensee had appropriately classified the significance level for Callaway Action Requests and did not identify a negative trend from this review. Specifically, for the population reviewed, the licensee assigned a significance level to 65 items when no significance level had been assigned, downgraded 25 items to a lower significance of which 15 received apparent cause evaluations and 6 received a cause evaluation, and upgraded 53 items of which 34 received cause evaluations.

## Historical Issues

Example 1: After questioning by the NRC, the licensee documented in Callaway Action Requests 200609233 and 200500238 a less than adequate operability determination for a degraded main steam isolation valve accumulator, which resulted in failure to implement the required Technical Specification 3.7.2 actions (Inspection Report 05000483/2006012-03).

Example 2: The NRC determined that the licensee failed to properly evaluate and correct inadequate emergency procedures for the design basis large break loss of coolant accident, as documented in Callaway Action Requests 200602565 and 200608102. Specifically, the licensee repeatedly missed opportunities that had presented themselves in Callaway Action Requests, NRC findings, and vendor technical bulletins to uncover inadequate guidance in Procedure E-1, "Loss of Reactor or Secondary Coolant" (Inspection Report 05000483/2006011-01).

Example 3: The team determined that the licensee failed to evaluate all vulnerable emergency core cooling system piping subject to voiding in response to a previous NRC-identified violation for ineffective corrective actions. The team determined the licensee failed to meet the requirements of 10 CFR Part 50, Appendix B, Criterion XVI. Specifically, the licensee did not design and install vents for a significant length of horizontal piping subject to the same deficiency and containing some high points, as documented in Callaway Action Request 200608466 (Inspection Report 05000483/2006012-04)

Example 4: The Maintenance Rule Expert Panel failed to adequately review the failure of safety-related motor-operated valves, which prevented thoroughly evaluating the problem to ensure resolutions address causes and extent of conditions (Inspection Report 05000483/2006005-02).

Example 5: Engineering performed an inadequate 10 CFR 50.59 safety evaluation, which resulted in a less than thorough evaluation of the problem to ensure resolutions addressed causes and extent of conditions (Inspection Report 05000483/2006005-04).

### (c) Assessment - Effectiveness of Corrective Actions

The licensee implemented effective corrective actions to address conditions adverse to quality because of process improvements. The team determined the improvements addressed the weaknesses identified in the last biennial problem identification and resolution inspection, as evidenced by only a single licensee-identified failure to implement effective corrective actions. The team concluded that less than adequate past corrective action program performance continued to result in the discovery of latent engineering issues; for example, the ongoing challenges imposed by corrosion of the essential service water piping. The team evaluated the planned actions for these corrosion deficiencies and concluded that the licensee made appropriate operational decisions and took interim measures to ensure that the system remained operable until the next refueling outage when they plan to implement the permanent corrective actions.

The licensee had implemented a number of improvements in January 2007 that increased the effectiveness of the corrective action program. The changes included, in part:

- (1) improved definition of a condition adverse to quality in order to lower the threshold,
- (2) more categories for adverse conditions to allow for broke-fix and relieve the burden of

performing apparent causes for low significance conditions adverse to quality, (3) improved guidance for performing cause evaluations, including a quality checklist, and (4) improved guidance for performing immediate operability determinations. The team found that this approach ensured the licensee applied the appropriate level of resources to identified issues commensurate with their safety significance or impact on the facility. The team found the procedure guidance clear, concise, and useful to personnel implementing the corrective action program. The team determined that many of these changes should address some of the concerns identified during this inspection.

### **Current Issues**

Example: The licensee determined that they had implemented ineffective corrective actions for Callaway Action Request 200609621, which documented that personnel had failed to secure Fire Door DSK15031. The corrective action involved communicating the importance of reading and abiding to posted signs related to closing fire doors. Subsequently, additional instances of the improperly secured fire door occurred (i.e., Callaway Action Requests 200702037, 200702596, 200706810, and 200707100). After the licensee initiated corrective actions for Callaway Action Request 200702596, which involved locking the door pin to prevent unauthorized unlatching of the Fire Door DSK15031 stationary door, the licensee had discovered two additional instances prior to implementing the modification. This licensee-identified performance deficiency is documented in Section 4OA7.

### **Historic Issues**

Example 1: In Callaway Action Request 200609075, the licensee identified the failure to take effective corrective actions in response to Callaway Action Request 200205928, which documented missing sacrificial anodes in the emergency diesel generator heat exchangers. The team determined the licensee had missed an opportunity to correct this deficiency in October 2004. The failure to have all required sacrificial anodes installed was of minor safety significance since the heat exchanger remained operable.

Example 2: Callaway Action Request 200602995 described that personnel implemented inappropriate corrective actions for Callaway Action Request 200602565. Specifically, the NRC determined that the licensee made an ineffective procedure change related to establishing component cooling water flow to the residual heat removal heat exchangers prior to swap over to the containment recirculation sumps. The procedure change failed to prevent a potential runout condition for the component cooling water pumps (Inspection Report 05000483/2006011-02).

## **b. Assessment of the Use of Operating Experience**

### **(1) Inspection Scope**

The team examined licensee programs for reviewing industry operating experience. The team selected a number of operating experience notification documents (NRC bulletins, information notices, generic letters, 10 CFR Part 21 reports, licensee event reports, vendor notifications, et cetera), which had been issued during the assessment period, to verify whether the licensee had appropriately evaluated each notification for relevance to the facility. The team then examined whether the licensee had entered those items, which had been deemed relevant, into their corrective action program. Finally, the team reviewed a

number of significant conditions adverse to quality and conditions adverse to quality to verify if the licensee had appropriately evaluated them for industry operating experience.

(2) **Assessment**

The team identified some weakness in licensee evaluation and processing of operating experience. Specifically, failure to appropriately evaluate industry operating experience contributed to two findings in this area. The team documented Example 1, which related to untimely evaluation of applicable operating experience, in this inspection report. The team determined that Example 2 documents failure to effectively evaluate operating experience because the licensee did not consider all areas subject to flooding. Any finding that results from the failure to perform an appropriate flood analysis will be documented in the resident inspector integrated report. The team determined that the licensee continued to effectively assess industry operating experience during root cause and apparent cause evaluations of significant conditions adverse to quality and conditions adverse to quality, respectively.

**Current Issues**

Example 1: The team determined that the licensee failed to determine in a timely manner whether the acceptance criteria for Technical Specification Surveillance Requirement 3.8.4.5 demonstrated that the NK11 and NK14 safety-related batteries could meet the design requirements. The licensee initiated Callaway Action Request 200706268 in response to operating experience on July 10, 2007. The licensee inappropriately requested extension requests to complete their evaluation such that they had operated with this non-conservative Technical Specification until challenged by the team (refer to Section 40A2.e).

Example 2: In Callaway Action Requests 200502989 and 200607843, the licensee concluded that the flooding analysis summary took no credit for flooding in areas above the lower levels in each building. The team considered the evaluation inadequate because several flooding analyses credit floor drains at elevations other than the basement. For example, Calculation M-FL-07, "Flooding of the Aux Bldg Rms EL. 2047'6", evaluated the impact of flooding in the Control Room heating, ventilation and air conditioning room.

**Historical Issues**

Example: The licensee's corrective measures inappropriately used instrument uncertainty to increase design margin (Inspection Report 05000483/2006009-05).

c. **Assessment of Self-Assessments and Audits**

(1) **Inspection Scope**

The team reviewed numerous audits, self-assessments, quality surveillances, and site performance indicators. The team reviewed program procedures and interviewed process managers related to the performance improvement group, the corrective action program, and the Quality Assurance department. The team evaluated the use of self- and third party assessments, the role of Quality Assurance, and the role of the performance improvement group related to licensee performance.

(2) Assessment

The licensee continued to perform self-critical assessments, audits and evaluations. The team noted that the factors that influenced the improvement identified during the last corrective action program evaluation continued during this assessment period. Specifically, the licensee used directed assessments to evaluate suspect or known areas of weakness. The licensee implemented the recommendations and findings of external self-assessments that they requested. The licensee established processes to ensure increased management oversight at all levels in the organization related to improved worker performance, adherence to procedures, and conduct of root cause analyses.

Quality Assurance performed critical, detailed audits and surveillances of line organizations (Example 2). The audit performance criteria had goals of excellence (e.g., third party expectations and NRC inspection guidance) rather than compliance. The team determined that the line organizations continued to use audits and surveillances as a tool to improve their performance. For example, Quality Assurance performed three surveillances of critical activities related to the corrective actions planned for the essential service water system corrosion issues (Example 1).

The team verified that the licensee implemented performance indicators and trended data that should allow the managers to evaluate the progress of their actions to improve performance related to human performance and corrective action program deficiencies.

The licensee performed several self-assessments related to safety culture during this assessment period. The team evaluated the self-assessments and concluded that the licensee conducted critical evaluations of their safety culture and the safety conscious work environment (Examples 3 and 4). The licensee initiated Callaway Action Request 200800944 to perform a higher tier apparent cause evaluation and to ensure that they addressed the assessment recommendations. Recommendations included developing a differing professional opinion process, developing a process to review proposed disciplinary actions and performing benchmarking of other programs.

**Current Issues**

Example 1: Quality Assurance performed several critical surveillances related to corrosion in the essential service water system, which related to the examination scope of the piping, the repairs of the affected piping, and the suitability to operate during Cycle 16.

Example 2: Audit AP07-013, "Corrective Action Program," provided critical evaluations of the corrective action program areas that previously had problems, which included operability evaluations, prioritization, and management oversight. The team verified that the line organization had implemented appropriate corrective actions to address the numerous adverse conditions identified in the audit.

Example 3: The licensee performed a Synergy Safety Culture Assessment in February 2007. The Safety Culture Survey included an assessment of the general culture and work environment and the safety conscious work environment. The safety culture survey identified that the licensee had significant challenges related to resources/work load and change management that affected the trust of the workers in management. The survey identified that no chilling effect or safety conscious work environment concerns existed. However, the

results indicated, the general culture and work environment concerns could affect the nuclear safety culture and the safety conscious work environment, if not addressed by management.

Example 4: Because of the large number of allegations at the facility in Calendar Year 2007, the licensee requested an independent assessment to evaluate their safety conscious work environment in February 2008. The assessment determined that the licensee had maintained a safety conscious work environment and that no chilled work environment existed. The assessment team concluded work environment and corrective action program issues had the potential, if not addressed, to erode the willingness of individuals to bring issues forward using the corrective action program.

d. **Assessment of Safety Conscious Work Environment**

(1) **Inspection Scope**

The team evaluated this area by reviewing self-assessments and audits, interviewing personnel regarding the safety conscious work environment at Callaway Plant using the questions provided in Inspection Procedure 71152B, and interviewing the Employee Concerns Coordinator. Specifically, the team reviewed the Independent Assessment of the Callaway Plant Safety Conscious Work Environment performed in February 2008, the 2007 Safety Culture Assessment, and three department specific safety culture assessments.

The team conducted formal interviews with 93 personnel in response to the large number of allegations received at Callaway Plant, which had identified concerns with the safety conscious work environment. Normally, the inspection interviews 15 – 25 personnel. The team conducted the interviews with plant personnel to assess their willingness to raise safety issues and use the corrective action program. Further, the team assessed whether conditions existed that would challenge the establishment of a safety-conscience work environment. The team documented the details of the review in Attachment 3, "Concerns Evaluated." Note: Examples 1 – 5 below have corresponding numbers in Attachment 3.

(2) **Assessment**

From interviews and review of safety conscious work environment assessments, the team determined that the licensee maintained a safety conscious work environment. However, there were some issues identified that were outside NRC regulatory jurisdiction that, if not addressed by the licensee, could potentially affect the safety conscious work environment at the Callaway Plant. Overall, interviewed employees felt free to enter issues into the corrective action program as well as, raise nuclear safety concerns to their supervision, the employee concerns program, and the NRC. During interviews, personnel generally expressed confidence that the licensee had established an appropriate threshold for documenting nuclear safety issues and that issues entered into the corrective action program would be appropriately addressed.

The 2007 Safety Culture Assessment concluded that the licensee, generally, has a solid safety culture and that site personnel have nuclear safety as a core value. However, the safety culture assessment identified several groups that required additional attention. The assessment also identified areas that management needed to address related to the general culture and work environment that included implementing appropriate change management, better management of resources, workload, staffing and priorities. The team verified that the

licensee had initiated Callaway Action Requests and had implemented appropriate corrective actions for the identified deficiencies.

Consistent with the 2005 Safety Culture Assessment, the 2007 Safety Culture Assessment, and the February 2008 Safety Conscious Work Environment self-assessment, the team determined that, generally, employees expressed willingness to use the corrective action program and raise nuclear safety concerns. The team determined that not all individuals were comfortable using all of the methods available to them for reporting concerns; however, all personnel would have used at least one of the methods available for reporting a safety concern. Also, the licensee continues to have challenges related to visibility of the Employee Concerns Program and the willingness of some people to use the Employee Concerns Program (Examples 2 and 3).

In response to numerous concerns (Examples 1 – 3) the team evaluated whether the licensee encourages personnel to identify problems. The team determined that management encourages personnel to identify problems and raise concerns using the corrective action program or through discussions with their supervisor. The team determined from this sample that no chilled work environment existed at Callaway Plant. However, within the security department, some individuals would not raise personal concerns. From review of two technical concerns (Examples 4 and 5), the team determined that the licensee had resolved the issues commensurate with their safety significance and regulatory requirements.

#### **Current Issues**

Example 1: The team evaluated whether the licensee had established a culture where personnel did not feel comfortable raising concerns and where management did not want to hear about problems. The team determined that management encouraged personnel to raise concerns. During interviews, all personnel indicated that they would raise nuclear safety concerns; however, some personnel indicated that they would not raise personal issues unrelated to nuclear safety because they believed that management would take no actions.

Example 2: The team evaluated how employees used the employee concerns program. The team determined that most, but not all, employees would use the employee concerns program if they did not get satisfaction from use of the corrective action program or from their supervisor. However, two individuals did not trust the employee concerns program and would rather talk to the NRC. The team determined that 30 percent of the personnel interviewed had a misconception of the employee concerns program (e.g., did not know the program coordinator had changed, did not know the purpose of the employee concerns program, did not know the location of the coordinator's office, et cetera).

Example 3: The team evaluated whether a chilled work environment existed in any department but focused particularly in the training, radiation protection, operations and security organizations. From the interviews, the team determined that all individuals would raise concerns by using one of the four methods - corrective action program, supervisor, employee concerns program, or NRC. However, the team determined that not all individuals would use all of the methods. Specifically, one individual would only talk with their supervisor.

Example 4: The team reviewed whether the licensee timely resolved the condition that damaged to the residual heat removal pump suction relief valves. The licensee missed an

opportunity to correct the error in March 2007 when a design error identified by a vendor prevented issuing the modification in time for implementation. The team verified that the licensee scheduled the modification for Refueling Outage 16 in October 2008. No violation resulted since the licensee will implement the modification commensurate with its safety significance.

**Example 5:** The team reviewed whether the licensee took the appropriate actions to not pursue a license amendment specifically prohibiting plant operation with both cold overpressure mitigation systems out of service with the reactor coolant system solid. Since the licensee had no shutdown probabilistic safety analysis, the team could not quantitatively determine whether it was safer to operate without cold overpressure mitigation system valves under solid plant conditions or saturated plant conditions. Further, the team determined that the licensee took appropriate actions to request an extension of the period allowed for establishing a reactor coolant system vent path from 8 to 12 hours.

**Example 6:** As discussed in the example in Section 4OA2.a(2)(a), security officers had identified that a specific security feature generated excessive nuisance alarms. The team determined that the licensee had initiated Callaway Action Requests related to other security organization issues that included a safety hazard while performing patrols and a health hazard. The team determined during interviews that these deficiencies did not affect the willingness of security officers to report deficiencies to their supervisor or to use the corrective action program.

e. **Specific Issues Identified During This Inspection**

**Introduction.** The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," because the licensee failed to ensure that Technical Specification Surveillance Requirements for the NK11 and NK14 safety-related batteries established limits that met the design requirements. Specifically, until questioned by the team the licensee failed to determine the required design value needed to assure plant safety. The licensee determined that 69 micro-ohms should be the actual allowed inter-cell voltage limit to meet the design requirements versus an allowed Technical Specification limit of 150 micro-ohms.

**Description.** The team reviewed Callaway Action Request 200706561 that the licensee initiated July 10, 2007, to evaluate the adequacy of Technical Specifications 3.8.4 and 3.8.5 for the NK11 and NK14 safety-related batteries. The licensee initiated Callaway Action Request 200706561 because external industry operating experience had identified that some licensees had not documented the basis for the 150 micro-ohm limit specified in Technical Specification Surveillance Requirements 3.8.4.2 and 3.8.4.5 and, in some cases, challenged the operability of the safety-related batteries when the limit was applied to each inter-cell connection. Callaway Action Request 200706561, Action 4 requested an evaluation to determine the appropriate maximum inter-cell resistance value for station batteries. The team determined that the licensee had not completed their evaluation of Surveillance Requirements 3.8.4.2 and 3.8.4.5 at the time of the inspection.

The team determined that Procedure APA-ZZ-01400, Attachment 4, "Industry Operating Experience Screening Committee Guidelines," Section 4.b, states that Operating Experience Callaway Action Requests should be assigned due dates not to exceed 60 days to ensure a timely determination of plant impact. The team determined that, while the licensee had

assigned a completion date within 60 days, personnel had obtained several extensions that prevented assessing the significance or facility impact within the initial 60 days specified in Procedure APA-ZZ-01400. Consequently, these extensions delayed evaluating Surveillance Requirements 3.8.4.2 and 3.8.4.5. Following discussion with the team, the licensee evaluated the current design assumptions in Calculation NK-05, "Class 1E Battery Capacity," Revision 6, which the licensee had used to size the NK11 and NK14 safety-related batteries. The licensee's evaluation found that the licensee based the battery sizing on an end discharge voltage of 108.6 volts correlating to a maximum inter-cell resistance of 86.1 micro-ohms. Since the 86.1 micro-ohms limit was less than that allowed by Surveillance Requirements 3.8.4.2 and 3.8.4.5 (indicating a nonconservative Technical Specification), the licensee performed an additional calculation to determine an appropriate inter-cell resistance to support battery operations. Upon completing Calculation NK-10, "NK11 Accident Case," Revision 1, the licensee would need to limit the maximum inter-cell resistance to 69 micro-ohms to assure battery operability.

Following discovery of the non-conservative inter-cell resistance, the licensee performed a prompt operability determination and concluded the NK11 and NK14 safety-related batteries remained operable since past surveillances had measured inter-cell resistances well below 69 micro-ohms. The licensee implemented compensatory measures as described in NRC Administrative Letter 1998-10, "Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety," to assure the new inter-cell resistance limit of 69 micro-ohms would not be exceeded. The licensee intended to continue the interim compensatory measures until they revised their Technical Specifications.

Analysis. The performance deficiency associated with this finding involved the failure to ensure that the NK11 and NK14 safety-related batteries would remain operable if all the inter-cell connections measured 150 micro-ohms as allowed by Technical Specification Surveillance Requirements 3.8.4.2 and 3.8.4.5. This finding was greater than minor because it was associated with the Mitigating Systems cornerstone attribute of maintenance and testing and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have very low safety significance because it was a design deficiency confirmed not to result in loss of operability. The finding had a crosscutting aspect in the area of problem identification and resolution associated with operating experience because the licensee failed to evaluate in a timely manner relevant internal and external operating experience P.2(a).

Enforcement. Title Ten Code of Federal Regulations Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that the licensee establish measures to assure that applicable regulatory requirements and the design basis for structures, systems and components are correctly translated into specifications, drawings, procedures, and instructions. Additionally, design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculation methods, or by the performance of a suitable testing program. Contrary to the above, prior to March 13, 2008, the licensee failed to verify that the 150 micro-ohm criterion specified in Surveillance Requirement 3.8.4.2 and 3.8.4.5 would be sufficient to ensure safety-related battery operability in accordance with the design basis. Once challenged, the licensee determined that a maximum inter-cell resistance of 69 micro-ohm could not be exceeded to ensure the battery remained operable. This finding is of very low

safety significance and has been entered into the corrective action program as Callaway Action Request 200802195, this violation is being treated as a noncited violation consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000483/2008006-01, "Nonconservative Technical Specification for battery inter-cell connection resistances."

40A6 Exit Meeting

On March 14, 2008, the team presented their inspection results to Mr. A.C. Heflin, Vice President, and other members of his staff who acknowledged the findings. The inspectors returned all proprietary and confidential information provided during the inspection.

40A7 Licensee Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements that meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a noncited violation.

Technical Specification 5.4.1.d requires that AmerenUE maintain a fire protection program. Procedure APA-ZZ-0071, "Control of Impairments of Fire Protection Systems and Components," requires personnel to maintain the integrity of plant fire doors. Contrary to this, security officers identified during routine tours on March 6, March 20, July 18, and July 31, 2007, which personnel failed to maintain the integrity of Fire Door 15031. This licensee documented these deficiencies in Callaway Action Requests 200702037, 200702596, 200706810, and 200707100, respectively. This finding is of very low safety significance because the exposed fire area contained no potential damage targets that are unique from those in the exposing fire area.

Attachment: Supplemental Information

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

B. Barton, Manager, Training  
G. Belchik, Supervisor, Operations  
M. Daly, Supervising Engineer, Corrective Action Program  
F. Diya, Plant Director  
M. Dunbar, Protective Services Supervisor  
R. Farnam, Manager, Radiation Protection  
L. Graessle, Manager, Regulatory Affairs  
A. Heflin, Vice President - Nuclear  
T. Herrmann, Vice President Engineering  
T. Hermann, Manager, Maintenance  
D. Hollabaugh, Superintendent Protective Services  
L. Kanuckel, Manager, Quality Assurance  
G. Kremer, Supervising Engineer  
P. McKenna, Manager, Outage Planning and Scheduling  
M. McLachlan, Manager, Engineering Services  
S. Maglio, Assistant Manager, Regulatory Services  
B. Miller, Supervisor, Performance Improvement  
E. Olsen, Superintendent, Performance Improvement  
S. Petzel, Engineer, Regulatory Affairs  
J. Small, Superintendent, Chemistry and Radioactive Waste  
T. Steele, Employee Concerns Program Coordinator

#### NRC

R. Caniano, Director, Division of Reactor Safety (telephonically)  
J. Groom, Resident Inspector, Callaway Plant  
L. Smith, Chief, Engineering Branch 2, Division of Reactor Safety  
V. Watkins, Deputy Director, Division of Reactor Safety

### **LIST OF ITEMS OPENED AND CLOSED**

#### Opened and Closed

05000483/2008006-01    NCV    Nonconservative Technical Specification for Battery  
Inter-cell Connection Resistances (Section 4OA2.e)

## LIST OF DOCUMENTS REVIEWED

### Audits, Self-Assessments and Surveillances

- AP07-013, "Quality Assurance Audit of Corrective Action," dated December 13, 2007
- SA07-PI-C02, "Closing Condition Reports (CARS) to a Procedure Change Process," dated August 28, 2007
- SA07-PI-C06, "Trending Program Gap Analysis," dated August 2007
- SA07-PI-F01, "Mid-Cycle Self-Assessment," dated September 10-21, 2007
- SA07-PI-S01, "Gap Analysis between APA-ZZ-01400 and INPO 05-005," dated June 6, 2007
- SA07-PI-S02, "Prompt Human Performance Evaluation," dated May 23, 2007
- SA07-PI-S05, "Assessment of the Self-Assessment Program during the Mid-Cycle Self-Assessment," dated October 25, 2007
- SP07-001, "Assess Engineering Dispositions of Significance Level 3 CARs," dated February 15, 2007
- SP07-013, "Assure ESW Piping Has Been Determined Suitable for Continued Operations," dated April 3, 2007
- SP07-015, "Assessment of Corrective Actions for ESW Pipe Support Removal," dated April 11, 2007
- SP07-020, "Assess ESW Examination Plans and Methods during RF15 to Address Large Bore Pipe Pitting and Ensure Reliability during Cycle 16," dated April 13, 2007
- SP07-021, "Overview of the Refuel 15 Human Performance Area," dated June 6, 2007
- SP07-025, "Evaluate Refuel 15 ESW Repair/Replacement Activities," dated May 21, 2007
- SP07-035, "Evaluate Adequacy of Responses to Audit AP06-006, 'Design Control,'" dated September 25, 2007

### Calculations

- EB-10, "Allowable MCC circuit lengths for circuits with auxiliary relay coils in parallel with the starter coil," Addendum 1, Revision 0
- EJ-039, "Maximum Vent Times for Points Vented in Procedure OSP-SA-00003," Revision 0
- KJ-10, "Determine Tube Plugging Limits for DG Intercooler Heat Exchangers, DG Jacket Water Heat Exchangers and the Lube Oil Coolers," Revision 0

R-4152-00-1, "Revised Maximum Vent Volumes for EMV0250, EMV0251, and EMV0252 vent points," Revision 0

ZZ-179, "Plant AC Load List," Revision 7

Callaway Action Requests

200203882	200608956	200700284	200702529	200705936	200709330
200306252	200608979	200700286	200702568	200705968	200709522
200502093	200609233	200700392	200702596	200706133	200709523
200505716	200609441	200700560	200702685	200706143	200709540
200509540	200609580	200700893	200702864	200706268	200709652
200600012	200609603	200700956	200702956	200706453	200709812
200602144	200609621	200701164	200703065	200706476	200709813
200602645	200609628	200701177	200703069	200706561	200709819
200603734	200609710	200701261	200703177	200706810	200709852
200603736	200609726	200701336	200703189	200706933	200710351
200604147	200609805	200701362	200703244	200707100	200710418
200604872	200609809	200701369	200703260	200707368	200710764
200604878	200609809	200701371	200703317	200707375	200711084
200604991	200609812	200701372	200703901	200707468	200711176
200605025	200609813	200701406	200704101	200707485	200711177
200605046	200610010	200701407	200704113	200707490	200711227
200605143	200610048	200701559	200704169	200707508	200711235
200605179	200610063	200701573	200704176	200707518	200711236
200605252	200610112	200701591	200704226	200707572	200711254
200605751	200610359	200701654	200704366	200707628	200711257
200605879	200610423	200701660	200704472	200707788	200711314
200606432	200610426	200701930	200704598	200708122	200711496
200606707	200700023	200701944	200704742	200708186	200711541
200607188	200700063	200702003	200704911	200708219	200711883
200607327	200700096	200702037	200704913	200708233	200711916
200607496	200700100	200702057	200705117	200708241	200800085
200607835	200700115	200702144	200705142	200708270	200800248
200607843	200700218	200702202	200705149	200708671	200800585
200607911	200700224	200702276	200705263	200708941	200800878
200607985	200700260	200702339	200705349	200709002	200801268
200608466	200700262	200702371	200705484	200709165	200801664
200608902	200700265	200702373	200705489	200709171	200801877

Jobs

05104004      05506731      06129999      07007930      07008908

Requests for Resolution

200706500    200701932

Callaway Action Requests Significance Level 4 Reviews

200700815	200706812	200708769	200709845	200711009	200711696
200700839	200707147	200708778	200709868	200711028	200711741
200702456	200707184	200708873	200709894	200711036	200711831
200703494	200707250	200708942	200709959	200711067	200711955
200705711	200707294	200709232	200710139	200711378	200712005
200706212	200708020	200709657	200710446	200711481	200800007
200706427	200708062	200709660	200710537	200711543	200800152
200706571	200708068	200709698	200710915	200711647	200800205
200706688	200708435	200709740	200710923	200711662	200800226

Callaway Action Requests reviewed for component cooling water 5-year review

200300081	200302684	200402981	200500662	200509277	200800740
200300176	200306225	200407285	200502438	200510023	
200300762	200306229	200408368	200504816	200601037	
200300767	200306380	200408434	200507430	200602580	
200300837	200307361	200408696	200507574	200604400	
200301779	200401270	200500143	200507684	200710764	

Callaway Action Requests related to essential service water

200600553	200702464	200703247	200703899	200704785	200707154
200608086	200702496	200703279	200704226	200705002	200710009
200701786	200702724	200703313	200704366	200705126	200710571
200702151	200702733	200703514	200704421	200705489	
200702384	200703028	200703584	200704465	200705535	
200702434	200703222	200703776	200704598	200706190	

Information used to evaluate 480 Vac auxiliary contacts

200400789	200509628	200404059	200604013	200404301
200404392	200607324	200404486	200609726	
200405034	200704719	200507793	200709688	

Auxiliary Contacts Failure Trending

Replacement Timeline for NG 480 Vac Buckets

Project Plan MP01-1003/21130, "Replace Obsolete MCC Buckets (starters and aux contacts)," dated February 5, 2008

Procedure CC-74-14, "IEEE 323-1974, "Qualification and Test Summary Report for Class IE Motor Control Centers," Revision 6

### Procedures

APA-ZZ-00107, "Review of Current Industry Operating Experience," Revision 10  
APA-ZZ-00304, "Control of Callaway Equipment List," Revision 23  
APA-ZZ-00322, "Integrated Work Management Process Description," Revision 3  
APA-ZZ-00500, "Corrective Action Program," Revisions 44 and 45  
APA-ZZ-00500, Appendix 1, "Operability and Functionality Determinations," Revision 4  
APA-ZZ-00500, Appendix 5, "Maintenance Rule (MR)," Revision 2  
APA-ZZ-00500, Appendix 7, "Effectiveness Reviews," Revision 2  
APA-ZZ-00500, Appendix 12, "Significant Adverse Condition - Significance Level 1," Revision 1  
APA-ZZ-00500, Appendix 13, "Adverse Condition - Significance Level 2," Revision 1  
APA-ZZ-00500, Appendix 14, "Adverse Condition - Significance Level 3," Revision 2  
APA-ZZ-00500, Appendix 15, "Adverse Condition - Significance Level 4," Revision 3  
APA-ZZ-00500, Appendix 16, "Adverse Condition - Significance Level 5," Revision 2  
APA-ZZ-00500, Appendix 17, "Screening Process Guidelines," Revision 4  
APA-ZZ-00500, Appendix 21, "Other Issues - Significance Level 6," Revision 2  
APA-ZZ-0500A, "Business Tracking Process," Revision 5  
APA-ZZ-00604, "Requests for Resolution," Revision 20  
APA-ZZ-00930, "Employee Concerns Program," Revision 10  
APA-ZZ-01250, "Operational Decision Making," Revision 1  
APA-ZZ-01400, "Performance Improvement Program," Revision 6  
APA-ZZ-01400, Appendix E, "Operating Experience," Revision 3  
APA-ZZ-01400, Appendix F, "Performance Indicators," Revision 2  
APA-ZZ-01400, Appendix J, "Change Management," Revision 5  
EDP-ZZ-01112, "Heat Exchanger Predictive Performance Manual," Revision 13  
EDP-ZZ-01128, "Maintenance Rule Program," Revision 8  
EDP-ZZ-01131, "Callaway Plant Health Program," Revision 9  
EDP-ZZ-05000, "Engineering Product Quality," Revision 3  
LDP-ZZ-00500, "Corrective Action Review Board," Revision 10  
ODP-ZZ-00001, Addendum 12, "Operator Burdens and Workarounds," Revision 0  
TDP-ZZ-00076, "Training Department Self-Assessment Process," Revision 4  
TDP-ZZ-00075, "Training Department CARB," Revision 5

### Miscellaneous

Change Package MP 07-0066, "Replace Buried ESW Piping with HDPE Material," Revision 0

Callaway Plant 3<sup>rd</sup> Quarter and 4<sup>th</sup> Quarter Trend Reports

Health Risk EF-03-07, "Corrosion of Large Bore ESW Piping – ESW Flow Only (Includes Underground)"

Letter ULNRC-05434, "10 CFR 50.55a Request: Proposed Alternative to ASME Section XI Requirements for Replacement of Class 3 Buried Piping," dated August 30, 2007

Letter ULNRC-05445, "Application for Amendment to Facility Operating License NPF-30, One-Time Completion Extension for Essential Service Water (ESW) System," dated October 31, 2007

Proto-Power Corporation Letter to Alex Smith, "Callaway Plant Heat Exchange Engineer, RE: Summary of GL 89-13 Program Review," dated December 21, 2006

Training Excellence Plan 2008 – 2012, dated February 7, 2008

Safety Conscious Work Environment

Callaway Plant Business Plan 2008 – 2012

Employee Concerns Program Pamphlet

NEI 97-05, "Nuclear Power Plant Personnel-Employee Concerns Program-Process Tools in a Safety Conscious Work Environment," Revision 2

Nuclear Division Policy POL0017, "Safety Conscious Work Environment Policy," Revision 2

Procedure SDP-PI-DEFNS, "Static Defensive Position," Revision 1

Procedure APA-ZZ-00930, "Resolving Quality Concerns," Revision 4 (10/30/2004)

Regulatory Issue Summary 2005-18, "Guidance for Establishing and Maintaining a Safety Conscious Work Environment," dated August 25, 2005

Regulatory Issue Summary 2006-13, "Information on the Changes Made to the Reactor Oversight Process to More Fully Address Safety Culture," dated July 31, 2006

SEGR 07-34, "QA Department Detailed Evaluation of Synergy/VPO Results," dated November 2, 2007

SEGR 07-35, "INPO SOER 02-04 Davis Besse CBT," dated November 16, 2007

Understanding SCWE - A Handbook on Safety Conscious Work Environment

As the Turbine Turns Articles on Principles for a Strong Nuclear Safety Culture (dated November and December 2006)

"An Independent Assessment of the Safety Conscious Work Environment at the Callaway Nuclear Plant," dated February 1, 2008

2005 and 2006 Allegation Trends Report evaluations related to the Callaway Plant

2006 Operations, Engineering and Training department NEI/USA safety conscious work environment questionnaires

2007 Safety Culture Survey

Callaway Action Requests reviewed related to safety conscious work environment

200404503	200502693	200601951	200610290	200706425
200406409	200502722	200604086	200706407	200706429
200407284	200504133	200604672	200706417	200707744
200407480	200506261	200606421	200706418	200708271
200408626	200601104	200606424	200706420	200800944
200501049	200601108	200607472	200706421	
200501953	200601377	200609882	200706423	

Anonymous Callaway Action Requests

200500861	200502772	200600955	200701820	200711093
200500862	200503740	200604751	200709845	200711543
200500679	200504155	200605954	200710703	

## Attachment 2

### Initial Information Request - December 26, 2007 Callaway Problem Identification and Resolution Biennial Inspection (IP 71152B; Inspection Report 05000483/2008006)

The inspection will cover the period of August 1, 2006, to February/March 2008. All requested information should be limited to this period unless otherwise specified. As discussed, you can upload the information to the Certrec inspection website. We would also like the information provided on a CD prior to our preparation week. We will break down the request by required dates to allow for effective preparation. Information provided in electronic media may also be in the form of e-mail attachment(s), CDs, or thumb drives. The Agency has converted to MSOffice. We have document viewing capability for Adobe Acrobat (.pdf) files and other image files.

Please have the information uploaded to the Certrec Website by January 25, 2008, if possible.

Note: On **summary lists** please include a description of problem, status, initiating date, and owner organization. Since you had a major conversion of your significance categories in January 2007, the team would like to have the requests divided, as necessary so that the information requested is compatible as far as significance. If you had existing CARS that were converted from the old system to the new system a list of those converted would be convenient.

1. Summary list of all Callaway Action Requests (CARS) of significant conditions adverse to quality (Significant level 1 and 2) opened or closed from 08/01/2006 thru the conversion implementation and (Significance Level 1, 2, and 3) after the conversion to the present.
2. Summary list of all CARS which were generated since 08/01/2006 separated by those prior to the conversion and following the conversion
3. A list of all corrective action documents that aggregate or "roll-up" one or more smaller issues for the period
4. Summary list of all action requests which were down-graded or up-graded in significance since 08/01/2006
5. List of all root cause analyses completed since 08/01/2006. Include in this listing those root causes considered as upper tier cause evaluations.
6. List of root cause analyses planned, but not complete at end of the period, include in this list the upper tier cause evaluations.
7. List of all apparent cause analyses completed since 08/01/2006.
8. List of plant safety issues raised or addressed by the employee concerns program since 08/01/2006

9. List of action items generated or addressed by the plant safety review committees since 08/01/2006
10. All quality assurance audits and surveillances of corrective action activities completed since 08/01/2006
11. A list of all quality assurance audits and surveillances scheduled for completion since 08/01/2006, but which were not completed
12. All corrective action activity reports, functional area self-assessments, and non-NRC third party assessments completed since 08/01/2006
13. Corrective action performance trending/tracking information generated since 08/01/2006 and broken down by functional organization. Quarterly reports are sufficient for this area if they are broken down by organization and issue.
14. Current revisions of corrective action program procedures for: Condition Reporting, Corrective Action Program, Root Cause Evaluation/Determination, Operator Work Arounds, Work Requests, Requests for Engineering Resolution (RFR), Temporary Modifications, Procedure Change Requests, Deficiency Reporting and Resolution, Operating Experience Evaluation
15. A listing of all external events (OE) evaluated for applicability at **Callaway** since 08/01/2006
16. Action requests or other actions generated since 08/01/2006 for each of the items below:  
 Part 21 Reports:  
 [Applicable] NRC Information Notices:  
 All LERs issued by AmerenUE  
 NCVs and Violations issued to AmerenUE (including licensee-identified violations)
17. Safeguards event logs
18. Current system health reports or similar information
19. Current predictive performance summary reports or similar information
20. Corrective action effectiveness review reports generated since 08/01/2006
21. List of risk significant components and systems
22. List of actions done and/or in the Human Performance Improvement Plan since the last PIR inspection
23. Outage maintenance that was not done for whatever reason.
24. Any rework of maintenance performed from last outage

### **Attachment 3 – Concerns Evaluated**

The NRC received a large number of allegations in Calendar Year 2007 at the Callaway Plant. Consequently, Region IV management requested the biennial problem identification and resolution inspection team to conduct a larger than normal number of safety conscious work environment interviews. The team grouped these concerns into three major areas (Examples 1 – 3) that reflected the types of statements made regarding the Callaway Plant. The team also reviewed two technical concerns (Examples 4 and 5).

#### **Example 1 - General Culture Concerns:**

- Callaway Plant has a culture that discourages disagreement with upper management and inhibits effective problem identification and resolution. (Operations)
- Management would prefer not to know about problems and is reluctant to fully investigate them. (Operations)
- Workers do not enter issues into the corrective action program because they will be tasked with resolving the issues. (Radiation Protection)
- Callaway does not have a healthy safety conscious work environment. (Radiation Protection, Operations)

#### **Example 2 - Employee Concerns Program Issues:**

- The Employee Concerns Program does not maintain confidentiality. (Training)
- The Employee Concerns Program dismisses concerns without research. (Training)
- Two workers would not raise issues to the Employee Concerns Program for fear of retaliation. (Operations, Engineering)
- The Employee Concerns Program was halted in the performance of an investigation. (Maintenance)

#### **Example 3 - Chilling Effects:**

- A work environment where employees feel free to raise concerns does not exist within the training and security departments, as well as the entire site in general. (Training, Security)
- A corrective action document was deleted from the corrective action program after the plant manager chastised the originator for writing it. (Training)
- Workers do not feel comfortable raising issues to the NRC because several individuals who have done so were terminated. (Radiation Protection)

#### **Example 4 - The condition that caused damage to the residual heat removal pump suction relief**

valves has not been addressed in a timely manner. (Operations)

Example 5 - Callaway Plant was not recognizing and committing to doing the right thing with regard to nuclear safety by not requesting a Technical Specification amendment that restricted solid plant operations upon a loss of two cold overpressure mitigation system relief. (Operations)

### **Evaluation – Examples 1, 2 and 3**

The NRC provided in Manual Chapter 0305, "Operating Reactor Assessment Program," a definition of a safety conscious work environment. Specifically, it is "an environment in which employees feel free to raise safety concerns, both to their management and to the NRC, without fear of retaliation and where such concerns are promptly reviewed, given their proper priority based on their potential safety significance, and appropriately resolved with timely feedback to employees."

Normally, an inspection team conducts 15 – 25 confidential interviews with employees to assess the safety conscious work environment at plants during biennial problem identification and resolution inspections. To develop a comprehensive assessment of the safety conscious work environment at Callaway Plant, the team interviewed 93 personnel in the operations, engineering, maintenance, radiation protection, security, outage planning, radioactive waste management, training, regulatory affairs and quality assurance organizations. The team used the questions prescribed in Inspection Procedure 71152B, "Identification and Resolution of Problems," to determine employee attitudes regarding the safety conscious work environment at Callaway Plant. The team informed the people selected by organizations who had expressed concern with the safety conscious work environment and by the results of the Callaway Plant 2007 Safety Culture Survey.

Generally, the team determined the following from the interviews:

- All personnel indicated that they would raise nuclear safety concerns by using one of the four methods - corrective action program, supervisor, employee concerns program, or NRC. However, the team determined that not all individuals would use all of the methods available to them. For example, one person indicated that he would not raise personal issues unrelated to nuclear safety because he believed that management would take no actions. Another individual indicated he would only talk to his supervisor.
- Not all employees would use the employee concerns program if they did not get satisfaction from use of the corrective action program or from their supervisor. Specifically, two individuals stated they did not trust the employee concerns program and would rather talk to the NRC.
- Thirty percent of the personnel interviewed had a misconception of the employee concerns program (e.g., did not know the program coordinator had changed, did not know the purpose of the employee concerns program, did not know the location of the coordinator's office, et cetera)

In addition, the team asked additional questions that reflected the statements of concerned individuals. For 52 of the 93 interviews, the team member asked the following specific questions to address the statements from concerned individuals in the operations, engineering, training, and radioactive waste management organizations:

- Do you believe that you can readily disagree with your management?
- Does your management encourage differing views?
- Does the culture here promote or inhibit using the corrective action program?
- Is management open to hearing problems?
- Is management reluctant to investigate problems fully?
- Does management recognize and commit to doing the right thing with regard to nuclear safety?

The team interviewed workers, supervisors, and managers. The individuals interviewed had a broad mix of experience at Callaway, from relatively new individuals to individuals with over 20 years of experience. The team questioned personnel on all of the operating crews. Without exception, the personnel interviewed responded to the above additional questions that: they felt free to disagree with all levels of management, the current culture at Callaway promotes effective problem identification and resolution, management encourages employees to raise nuclear safety problems and other concerns, and management fully investigates nuclear safety problems and other concerns.

The licensee had performed several assessments of their safety conscious work environment that included:

- 2005 Synergy Safety Culture Survey
- 2007 Synergy Safety Culture Survey
- 2006 operations, engineering and training organization safety conscious work environment surveys
- 2008 Independent Assessment of Safety Conscious Work Environment At Callaway

Generally, these assessments and surveys identified that the licensee maintained a safety conscious work environment; however, each of the surveys identified that general culture and work environment factors needed attention. The external surveys identified on site organizations that had poor responses relative to industry norms and to other onsite organizations that responded to the survey. Finally, each of the external surveys identified that the licensee should address the general culture and work environment factors so that a safety conscious work environment issue does not emerge. In response to the 2008 Independent Assessment, the licensee had initiated a Significance Level 2 Callaway Action Request to determine the root cause(s) and develop appropriate corrective actions. Since the licensee had not finalized their cause evaluation and

developed corrective actions at the time of this inspection, the next biennial problem identification and resolution inspection will evaluate the effectiveness of the corrective actions.

Because of the consistent responses among these assessments and our interviews, the team concluded that Callaway had maintained a safety conscious work environment although some areas and organizations required additional oversight.

#### **Evaluation – Example 4**

Previously, NRC had reviewed the timeline for development and implementation of this modification. NRC had concluded that the licensee did not properly develop the modification; therefore, the licensee could not implement the modification during Refueling Outage 15. From review of actions following the failure to implement the modification, NRC challenged the licensee regarding the ability of the relief valve discharge line to perform its function. From discussions with the licensee, NRC concluded that leaving the line unmodified would not significantly increase the risk to the plant, that the licensee planned to implement the modification in a manner commensurate with its safety significance and that the licensee had violated no regulations.

During this inspection, the team reviewed documentation related to implementing the modification and related to the modification and corrective actions. The team interviewed personnel familiar with implementation of the modification for the relief valves in the residual heat removal system. The team verified that the licensee had completed and scheduled the modification identified as a corrective action in Callaway Action Request 200601188. Modification Package 07-0007, "Modify the RHR Suction Relief Discharge Piping."

#### **Evaluation – Example 5**

The team evaluated this technical concern related to depressurizing the reactor coolant system while in solid plant conditions. The team performed the evaluation by interviewing plant personnel and reviewing applicable documents that included: Technical Specifications and Technical Specification Bases, Standard Technical Specifications, Technical Specification Task Force documents, a license amendment request, and internal e-mails on this topic.

Technical Specification 3.4.12.G states that with two required relief valve inoperable, action shall be taken to depressurize the reactor coolant system and establish a reactor coolant system vent greater than 2.0 square inches within 8 hours. Given this specification, it would appear that depressurizing with saturated conditions (a steam bubble) in the pressurizer would allow better pressure control than depressurizing with a solid pressurizer. Depressurizing with a steam bubble would reduce the risk of overpressurization because of better pressure control.

The industry, through an owner's group initiative, proposed to increase the Technical Specification completion time with an inoperable cold overpressure mitigation system from 8 hours to 12 hours for all three PWR designs. The NRC agreed this was a more realistic time to plan and execute the evolution and endorsed it by revising necessary Standard Technical Specifications to allow a 12-hour completion time with an inoperable cold overpressure mitigation system. The licensee submitted a license amendment request on November 29, 2007, which requests extending the completion time from 8 hours to 12 hours to depressurize the reactor coolant system and establish a vent.

The license amendment did not request a limitation that the Technical Specification be carried out exclusive of solid plant operations. Requesting such a limitation would exceed and be more restrictive than what NRC had previously reviewed as acceptable for Technical Specification changes. The licensee would have to demonstrate such a change as risk beneficial as described in Regulatory Guide 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities."

The team determined through interviews and reviewing documented e-mails, discovered that Callaway Plant personnel had discussed this issue with their industry Technical Specifications group and submitted their licensee amendment request without a provision to prohibit solid plant operation. This change to a 12-hour completion time would likely address the concern as evidenced by a senior reactor operator at the Callaway Plant writing that the 12-hours allowed should be enough to comply with the Technical Specification while the pressurizer remains saturated with a steam bubble.

The team concluded that Callaway Plant management made an acceptable decision to not exceed what was considered as an acceptable path to ensure plant safety by not prohibiting solid plant operations with respect to Technical Specification 3.4.12.G. Further, based upon the discussions in Examples 1, 2, and 3 above in general and based upon this instance specifically, the team determined that Callaway Plant recognized and committed to take appropriate actions. Specifically, the licensee researched the issue and submitted a Technical Specification amendment that requested the longest completion time allowed by Standard Technical Specifications.

**Callaway Plant PI&R Inspection  
Inspection Report 2008006  
2/11 - 3/14/2008**

**G. Pick (4660)**

**PIM   NRC   NA   NA   NA   March 14, 2008   71152B   NA**  
**Biennial Problem Identification & Resolution Assessment**

The team reviewed 246 Callaway Action Requests, several job orders, engineering evaluations, associated root and apparent cause evaluations, and other supporting documentation to assess problem identification and resolution activities. The team reviewed an additional 124 Callaway Action Requests related to specific areas - essential service water, component cooling water, 480 Vac auxiliary contacts and safety conscious work environment. Based on the sample selected for review, the team concluded the licensee continued to have challenges in the area of prioritization and evaluation, which require additional effort. The team also noted that licensee performance related to problem identification and resolution had improved. The team determined the licensee had used the self-assessment process and quality assurance organization to improve site performance. The team determined the improvement resulted from corrective action process improvements implemented in January 2007, and management oversight changes implemented following receipt of substantive cross-cutting issue in problem identification and resolution.

The team determined that the licensee had initiated actions that improved the quality of their operability assessments, operational decision-making, and knowledge of the detailed design and licensing basis since the last evaluation. The graduated approach to assigning cause evaluations for conditions adverse to quality and the change that required the Callaway Action Request screening committee to review all Callaway Action Requests provided increased assurance in the ability of the licensee to identify and effectively resolve conditions adverse to quality.

The team determined that the licensee properly evaluated industry operating experience when performing root cause and higher tier cause evaluations; however, the licensee had continued challenges effectively evaluating industry operating experience.

The team determined that licensee audits and assessments continued to be detailed, probing, and self-critical. The licensee continued to use benchmarking of industry best practices and third party evaluations that improved the corrective action program performance during this assessment period. The licensee had effectively implemented performance improvements to address the substantive cross-cutting issue (refer to March 2, 2007, End of Cycle letter) related to evaluating actions required for conditions adverse to quality as demonstrated by the decreased number of findings in the latter half of this assessment period and lower affect that poor evaluations had on the facility. However, the licensee will need to apply additional effort to affect improvements. The improving performance resulted from increased management involvement in the corrective action program and in daily activities.

Because of the increased number of allegations at the facility in Calendar Year 2007, including several discrimination concerns, the team interviewed more personnel than normal to assess the safety conscious work environment at the Callaway Plant. The team documented the nature of the concerns and the increased scope of the evaluations in Attachment 3. The team determined that not all individuals were comfortable using all of the methods available to them for reporting

concerns; however, all personnel would have used at least one of the methods available for reporting a safety concern. In addition, the team determined that the employee concerns program requires more visibility and that not all personnel had confidence in the employee concerns program. The team determined that our review results remained consistent with other safety culture surveys that Callaway Plant had completed within the last year. The team determined that some general culture and work environment issues continued to be present from the last assessment that were outside NRC regulatory jurisdiction, which if not addressed could potentially affect the safety conscious work environment at the Callaway Plant.

A. Inspector-Identified and Self-Revealing Findings

**Cornerstone: Mitigating Systems**

**J. Groom (4660)**

**PIM NRC NCV BI Green March 14, 2008 71152B P.2(a)**  
**Nonconservative Technical Specification for Battery Inter-cell Connection Resistances**

The team identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," because the licensee failed to ensure that Technical Specification Surveillance Requirements for the NK11 and NK14 safety-related batteries established limits that met the design requirements. Specifically, until questioned by the team the licensee failed to determine the required design value needed to assure plant safety as requested in Callaway Action Request 200706561. The licensee determined that 69 micro-ohms should be the actual allowed inter-cell voltage limit to meet the design requirements versus an allowed Technical Specification limit of 150 micro-ohms.

The performance deficiency associated with this finding involved the failure to ensure that the NK11 and NK14 safety-related batteries would remain operable if all the inter-cell connections measured 150 micro-ohms as allowed by Technical Specification Surveillance Requirements 3.8.4.2 and 3.8.4.5. This finding was greater than minor because it was associated with the Mitigating Systems cornerstone attribute of maintenance and testing and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have very low safety significance because it was a design deficiency confirmed not to result in loss of operability. The finding had a crosscutting aspect in the area of problem identification and resolution associated with operating experience because the licensee failed to evaluate in a timely manner relevant internal and external operating experience P.2(a).