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

December 26, 2006

Charles D. Naslund, Senior Vice
President and Chief Nuclear Officer
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P.O. Box 620
Fulton, MO 65251

SUBJECT: CALLAWAY PLANT - NRC PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000483/2006012

Dear Mr. Naslund:

On November 3, 2006, the U. S. Nuclear Regulatory Commission completed the onsite portion of a team inspection at your Callaway Plant. The enclosed report documents the inspection findings, which were discussed on November 30, 2006, with you and other members of your staff during an exit meeting.

This inspection was an examination of 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 230 action requests, several job orders, associated root and apparent cause evaluations, and other supporting documents. The team reviewed cross-cutting aspects of NRC and licensee-identified findings and interviewed personnel regarding the condition of your safety conscious work environment at the Callaway Plant.

On the basis of the sample selected for review, the team concluded that, generally, your staff effectively identified, evaluated and prioritized, and implemented effective corrective actions for conditions adverse to quality. Your performance remained generally consistent with the last problem identification and resolution inspection, with noted corrective action process improvements. Five corrective action program related findings were identified, indicating that additional effort is needed in all three corrective action program areas. The findings included: 1) failure to initiate a Callaway Action Request, consequently adverse conditions did not enter the corrective action program; 2) failure to recognize problems as being conditions adverse to quality, which resulted in bypassing the corrective action program screening process; 3) inadequate operability determinations because of a lack of familiarity with design and license basis information resulted in poor operational decision making; 4) failure to effectively implement actions to prevent recurrence of significant conditions adverse to quality resulted in repeat feedwater transients and safety injection system voiding issues, which challenged the credibility of the extent of condition corrective actions; and 5) failure to promptly correct conditions adverse to quality. These findings were determined to be violations of NRC

requirements. However, because of their very low safety significance and because they have been entered into your corrective action program, the NRC is treating these findings as noncited violations, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. In addition, two licensee-identified violations determined to be of very low safety significance are also 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, with 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/

Linda J. Smith, Chief
Engineering Branch 2
Division of Reactor Safety

Docket: 50-483
License: NPF-30

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NRC Inspection Report: 05000483/2006012
w/attachment: Supplemental Information

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ENCLOSURE

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	05000483
License:	NPF-30
Report:	05000483/2006012
Licensee:	Union Electric Company
Facility:	Callaway Plant
Location:	Junction Highway CC and Highway O Fulton, Missouri
Dates:	October 16, through November 30, 2006
Team Leader:	G. Pick, Senior Reactor Inspector, Engineering Branch 2
Inspectors:	D. Dumbacher, Resident Inspector, Callaway Plant H. Abuseini, Reactor Inspector, Engineering Branch 2 P. Goldberg, Reactor Inspector, Engineering Branch 2
Approved By:	Linda Smith, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF ISSUES

IR 05000483/2006012; 10/16/2006 - 11/30/2006; Callaway Plant; Biennial inspection of the identification and resolution of problems; five violations were identified; two related to problem identification, two related to poor evaluations and one related to ineffective corrective actions.

The inspection was conducted by one senior reactor inspector, two reactor inspectors, and a resident inspector. Five Green noncited violations were identified 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 3, dated July 2000.

Identification and Resolution of Problems

The team reviewed 230 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 concluded that, generally, the licensee effectively identified, evaluated and prioritized, and implemented effective corrective actions for conditions adverse to quality. However, the team identified that additional effort is needed in all three areas. The team identified some instances of failure to initiate corrective action documents and numerous examples of failure to appropriately classify deficiencies as conditions adverse to quality. The team determined that quality and documentation for operability assessments has not improved significantly over the course of the evaluation period. Further, on occasion personnel were not self-critical as reflected by poor operational decision making. Two examples of findings reflect the condition of the corrective action problem evaluation activities in the mid portion of the assessment period. The team remained concerned that a lack of understanding of the detailed design and licensing basis continued to be evident in problem resolution. The team concluded that the licensee, generally, implemented timely, effective corrective actions, although some examples indicate continuing weakness in this area.

The team determined that the licensee had increased efforts to evaluate existing industry operating experience for relevance to the facility, and had entered identified items in the corrective action program; however, the team identified some examples that contributed to plant events.

The extensive performance improvement plan developed to address the substantive cross-cutting issue in human performance has addressed daily worker practice issues very well, although recent events occurred that indicate challenges remain. The increased management involvement in the corrective action program and in daily activities assisted in the improved performance. The team determined that licensee audits and assessments became more detailed, probing and self-critical with better assessments at the end of the assessment period. The licensee used benchmarking of industry best practices and third party evaluations that improved the corrective action program during this assessment period. While some of the changes were too recent to evaluate, the team concluded that improvements in the significant

root cause process, Corrective Action Review Board graded approach, and scope and timing of corrective actions had improved.

On the basis of formal and informal interviews conducted during this inspection, the team determined that employees will raise issues to their supervision, use the corrective action program, and if necessary, bring concerns to the employee concerns program. The team concluded that the licensee established an acceptable and improving safety-conscious work environment. However, some indication exists that additional effort is needed to encourage the free flow of information to ensure safety issues are resolved promptly.

A. Inspector-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for failure to initiate Callaway Action Requests for conditions adverse to quality that affected the reliability of mitigating systems. Specifically, on August 17, 2005, and on May 30, 2006, the licensee discovered a high point air trap in the Train A safety injection discharge piping and decreasing water level in Steam Generators A and D; however, the licensee failed to enter these conditions adverse to quality into their corrective action program. The water in the main steam line contributed to a water hammer and the void had the potential to impact operability of the safety injection system. The licensee entered this deficiency into their corrective action program as Callaway Action Request 200609812.

  The performance deficiency involved the failure to initiate corrective action documents for identified conditions adverse to quality, as required. This finding is more than minor because it is associated with the equipment performance attribute of the mitigating systems cornerstone and affects the associated cornerstone objective to ensure the reliability and availability of systems that respond to initiating events. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone, was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. The finding has cross-cutting aspects related to problem identification and resolution, in that, personnel did not identify issues at a low threshold and in a timely manner commensurate with their safety significance (Section 4OA2.e(2)(a)).

- Green. The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, and the corrective action program because licensee personnel failed to recognize and to identify two separate examples as conditions adverse to quality. Specifically, on April 13, 2006, and on October 17, 2006, licensee personnel did not identify blocked containment cooler tubes and a dirty emergency diesel generator turbocharger air intake filter, respectively, as conditions adverse to quality. Failure to recognize these conditions as degraded and identify them as conditions adverse to quality, delayed the immediate evaluation of operability and implementation of corrective

actions. The licensee entered this deficiency into their corrective action program as Callaway Action Request 200609813.

The performance deficiency involved the failure to promptly identify and correct conditions adverse to quality. The inappropriate classification of Callaway Action Requests 200602989 and 200608806 as Action Notice Callaway Action Requests delayed and prevented actions required by the corrective action program. This finding is greater than minor because a later evaluation by the licensee determined that safety related equipment had been adversely affected. [This deficiency is similar to Manual Chapter 0612, Appendix E, Example 4.a.] Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. The finding has cross-cutting aspects related to problem identification and resolution, in that, personnel did not identify issues at a low threshold and in a timely manner commensurate with their safety significance (Section 4OA2.e(2)(b)).

- Green. The team identified a noncited violation of Technical Specification 3.7.2, after operations personnel failed to enter and implement required Technical Specification 3.7.2 actions. Specifically, the licensee had performed an inadequate operability determination related to a degraded main steam isolation valve that resulted in exceeding the allowed Technical Specifications out-of-service time between December 29 and 31, 2004. On October 19, 2006, the NRC determined that the licensee should have declared the main steam isolation valve and its actuation channel inoperable after removing one of two hydraulic actuators from service. The licensee entered this deficiency into their corrective action program as Callaway Action Request 200609233.

  The performance deficiency involved the failure to perform an adequate operability evaluation of degraded plant equipment. As a result, the licensee failed to comply with the Technical Specifications. This finding is greater than minor because the configuration control attribute of the barrier integrity cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events is affected. The team used the "At Power Significance Determination Process," of Manual Chapter 0609. The team concluded that a Phase 2 analysis was required because this finding affects both the fuel and containment barriers.

  The team performed a Phase 2 analysis using the "Risk-Informed Inspection Notebook for Callaway Nuclear Generating Station Unit 1," Revision 2. The team assumed that (1) one of two actuator trains was unavailable on one main steam isolation valve for less than 3 days and (2) the degraded actuator did not reduce the remaining main steam isolation valve mitigation capability credit to less than full mitigation credit. Based on the results of the Phase 2 analysis, this finding is determined to have very low safety significance. This finding has a cross-cutting aspect in the area of problem identification and resolution because the licensee did not thoroughly and correctly evaluate the operability of the degraded main steam isolation valve (Section 4OA2.e(2)(c)).

- Green. A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, resulted from the failure to correct, and preclude repetition of (evaluate extent of condition), a significant condition adverse to quality related to identification of high spots in horizontal safety injection system discharge piping. Specifically, the licensee failed to identify all high spots in the susceptible discharge piping in February 2005; consequently, a modification did not prevent recurrence of voids collecting in high spots. The licensee entered the deficiency into their corrective action program as Callaway Action Request 200608644.

  The performance deficiency involved the failure to effectively evaluate all susceptible points in the Train A safety injection discharge piping. This finding is more than minor because it is associated with the equipment performance attribute of the mitigating systems cornerstone and affects the cornerstone objective of ensuring the availability of systems that respond to initiating events. The failure of the design change affected the reliability of the safety injection system. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. This finding has a cross-cutting aspect related to problem identification and resolution, in that, the licensee did not thoroughly evaluate the voiding problems such that the resolutions addressed the extent of condition (Section 4OA2.e(2)(d)).

- Green. A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI resulted after operations personnel failed to implement corrective actions. Specifically, the licensee failed to modify Procedure OSP-AL-V0003, "Auxiliary Feedwater Pump Discharge Check Valve (ALV0054) Closure Test," to ensure that upstream piping would be vented prior to performing the test to prevent overpressurizing the turbine-driven auxiliary feedwater pump suction pipe. The licensee entered this deficiency into their corrective action program as Callaway Action Request 200509277.

  The performance deficiency involved the failure to change a procedure as recommended in a corrective action to prevent recurrence. This finding associated with failure to implement corrective action is greater than minor because, if left uncorrected, the finding would become a more significant safety concern. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. This finding has a crosscutting aspect in the area of human performance associated with resources because the licensee did not ensure complete, accurate, up-to-date procedures were available to plant operators (Section 4OA2.e(2)(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 were identified in the assessment period, which ranged from April 2004 to October 2006. The issues are divided 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 that were 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 selected 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 observed control room operations and performed field walkdowns of the emergency diesel generator systems to inspect for deficiencies that should have been entered into the corrective action program. The team reviewed operator logs, plant tracking logs, and station job orders to ensure conditions adverse to quality were being entered 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 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 (CARs) written over the last 5 years that addressed the emergency diesel generator systems.

The team reviewed plant records, primarily CARs 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 CARs that addressed past NRC 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 CARs, job

orders, or tracking programs to ensure that corrective actions were still appropriate and timely.

(2) Assessments

(a) Assessment - Effectiveness of Problem Identification

Usually, the licensee identified deficiencies as conditions adverse to quality and entered them into the corrective action program. However, several incidences occurred that indicate additional effort is needed. Specifically, because of process and training issues, the licensee had not always adequately recognized, identified, and entered conditions adverse to quality into the corrective action program, which resulted in the team identifying two separate violations. One violation resulted from failure to initiate a CAR on two occasions for conditions adverse to quality that impacted safety related systems (Example 1). The second violation related to documenting conditions adverse to quality as Action Notice CARs (Example 2). Additional examples resulted from licensee personnel who inappropriately documented conditions adverse to quality in Action Notice CARs (Examples 3 and 4).

The licensee had independently recognized the inappropriate use of Action Notice CARs describing conditions adverse to quality and had initiated quarterly corrective action program group audits to identify any Action Notice CARs that were misclassified. However, this audit did not catch additional Action Notice CARs later identified by Quality Assurance and the resident inspector in the third quarter of 2006 (Example 5). The team concluded these examples had minor significance and were a small percent of the total number of Action Notice CARs. Nevertheless, the team considered this further indication of the need for additional licensee effort in the area of problem identification. Bypassing the screening committee could have resulted in failure to take appropriate corrective actions, failure to inform licensed operators about degraded equipment and failure to ensure that deficiencies received immediate operability evaluations.

In addition, the team identified other examples of poor problem identification, as illustrated by several issued findings during the assessment period (Examples 6 - 9).

Generally, the routine licensee review of CARs identified adverse trends; however, the team determined that the resident inspectors had identified several adverse trends that the licensee had not identified (Examples 10 and 11).

Current Issues

Example 1: Licensee personnel failed to initiate CARs 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 (refer to Section 4OA2.e(2)(a)).

Example 2: The team considered two Action Notice CARS (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 (refer to Section 4OA2.e(2)(b)).

- CAR 200602989 documented a degraded and nonconforming condition in that thermography of the containment cooler tubes found 16 percent of the tubes blocked. The licensee concluded that the coolers would have performed their design function after the team identified this as a misclassified adverse condition.

- After the team challenged the condition of the emergency diesel generator turbocharger oil bath intake filters because of the significant amount of accumulated dirt, the licensee documented this condition adverse to quality in CAR 200608806. The team expressed concerns related to the failure to perform an initial operability evaluation. Subsequent inspection demonstrated that the emergency diesel generator had remained operable.

Example 3: The following additional Action Notice CARs were not properly classified as conditions adverse to quality; however, these examples were not considered more than minor findings:

- CAR 200603636 documented a deficiency in design documentation in that a 4KV essential bus termination drawing had some points incorrectly labeled as NB01 versus NB02, which could have resulted in incorrect wire terminations.

- CAR 200604166 identified a failure to follow procedure requirements for foreign material exclusion. The foreign material was not found to have made any equipment inoperable.

- CAR 200605466 described that the turbine-driven auxiliary feedwater pump governor control cabinet air supply fan might not work with a loss of offsite power since the environment qualification temperature basis was unknown. Further review verified the cabinet environment qualification was based solely on room ambient temperature.

Example 4: On November 23, 2005, Quality Assurance issued CAR 200509623 to document the failure of the line organization to reclassify Action Notice CAR 200506433 as a condition adverse to quality after they had found evidence of tin whiskers and initiated corrective actions in response to evaluating plant components based upon processing operating experience (refer to Section 4OA7).

Example 5: During audits from January 2005 through October 9, 2006, the licensee identified 63 CARs that had been inappropriately initiated as Action Notice CARs rather than conditions adverse to quality. Quality Assurance issued CAR 200606131 to document six CARs were listed as Action Notice CARs instead of conditions adverse to quality. During review of the third quarter audit data, the team identified an additional eight Action Notice CARs that should have been captured by the audit process. This represented a 33 percent increase. The team confirmed that the licensee had

appropriately determined that approximately 0.5 percent of the Action Notice CARs were being misclassified; however, none of the issues were considered significant.

Example 6: The licensee initiated CAR 200508987 in response to a 10 CFR Part 21 notification from Prime Measurements, Inc.; however, the licensee did not evaluate the need to re-qualify the secondary steam flow/pressure transmitters in accordance with environmental qualification requirements. NRC continues to review the significance of this issue.

Example 7: As a result of NRC questions, the licensee initiated CARs 200509189 to document their failure to recognize that the minimum gap size for the containment recirculation sump had been exceeded (NRC Inspection Report 05000483/2005005-01).

Example 8: CAR 200408337 described that the NRC concluded an inadequate review of a plant modification to the main feedwater isolation valves led to a failure to identify that Technical Specification stroke time acceptance criteria could not be met (NRC Inspection Report 05000483/2004005-05).

Example 9: During tours, the resident inspectors identified a canvas tool bag located next to insulation material within a "No Combustible Material Allowed" zone, which was considered minor (CAR 200407261).

Example 10: The NRC identified an adverse trend related to "less than adequate control room operators attention to detail" (NRC Inspection Report 05000483/2006003).

Example 11: The NRC identified an adverse trend related to "fire protection deficiencies," (NRC Inspection Report 05000483/2005005).

Historical Issues

The licensee failed to identify the following historical degradations and inappropriate plant conditions related to correctly translating licensing bases requirements into operating practices and specifications. The NRC identified these examples as an adverse trend in NRC Inspection Report 05000483/2004005:

- Failure to incorporate steam generator overfill safety evaluation report into the licensing bases (Licensee Event Report 2003-003)

- Inadequate corrective actions taken following identification of an unanalyzed condition which resulted in postulated postaccident control room dose limits to be exceeded (NRC Inspection Report 05000483/2003005-03)

- Engineering evaluation incorrectly approved leaving health physics doors open (Licensee Event Report 2003-007)

- Failure to assure that applicable regulatory requirements and the design basis for the containment radiation gas monitors was correctly translated (NRC Inspection Report 05000483/2003005-04)

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

Generally, the licensee appropriately prioritized and evaluated conditions adverse to quality. However, because of the large number of violations that occurred, the team determined that additional improvement is required. Specifically, during this assessment period (current Issues), the team determined the licensee had four examples of poor operability (Examples 1 - 4) and five examples of poor root cause (Examples 5 - 9) evaluations. The team attributed the cause for the poor evaluations of both type, in part, to poor or less than adequate understanding by operations and engineering of the detailed design and licensing bases. In some instances, licensee personnel failed to demonstrate an appropriate self-critical attitude that reflected poor operational decision making (Examples 1, 3, and 5) or that resulted in a failure to either identify the root cause or correctly determine operability (Examples 1 - 4). One example resulted in a violation for failure to identify the extent of condition in a timely manner (Example 6). Two violations of inadequate operability evaluations had occurred during the early part of the assessment period (Examples 1 and 4).

Although outside organizations continued to identify that the licensee did not correctly evaluate conditions adverse to quality, the licensee implemented corrective actions to address the more basic negative contributors to evaluating problems. In 2006, the team found that, for the sample of root cause analyses reviewed, the licensee performed more self-critical and exhaustive root cause evaluations in its review of significant conditions adverse to quality, as evidenced by a low number of findings during the last 6 months. The team attributed part of this improvement to increased management involvement and a “graded approach” (i.e., evaluation of the quality and content) by managers who comprise the Corrective Action Review Board.

Current Issues

Example 1: After questioning by the NRC, the licensee documented in CARs 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 (refer to Section 4OA2.e(2)(c)).

Example 2: CAR 200605143 documented inspection of the containment coolers during October 2005 that revealed 30 percent cooler tube blockage because of significant corrosion. The licensee concluded the containment coolers remained operable after only evaluating May 2005 differential pressure data. From review of August 2005 temperature data, the NRC concluded that the containment coolers would not have removed the design basis heat load (NRC Inspection Report 05000483/2006003-06).

Example 3: The NRC determined that the licensee failed to properly assess operability and promptly correct a condition adverse to quality for SGK04A, Train A control building air conditioning unit, as documented in CAR 200601177. With one of three cylinders in the compressor unit running hot (300°F), the licensee failed to recognize this condition exceeded the normal temperature by 120°F; hence, the licensee failed to conclude this condition rendered the unit inoperable (NRC Inspection Report 05000483/2006002-01).

Example 4: CARs 200404815 and 200408337 documented that the main feedwater isolation valves failed to meet licensing and design bases stroke-time requirements. Further, the Independent Technical Review Team also failed to recognize the inadequacy when assessing the test results (NRC Inspection Report 05000483/2004005-05).

Example 5: CAR 200603734 documented a reactor trip occurred on May 12, 2006, during a shutdown with reactor power below 48 percent. The licensee started the reactor prior to determining the underlying cause. Subsequently, the root cause team identified the root and underlying causes. The licensee failed to recognize the design basis operation of the rod control and feedwater systems and failed to recognize the procedure was inadequate. Failure to correct or identify the inadequate procedure that caused the reactor trip placed the plant at risk for recurrence of the event during startup (NRC Inspection Report 05000483/2006004-04).

Example 6: 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 (refer to Example 8). The team determined this inadequate evaluation was contrary to 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 CAR 200608466 (refer to Section 4OA2.e(2)(d)).

Example 7: Following questions by the resident inspectors, the licensee determined that, as a result of inadequate problem evaluations, personnel had failed to recognize that the containment coolers 18-month Technical Specification surveillance requirement was not being met for the containment heat exchanger performance monitoring, as documented in CAR 200600012 (NRC Inspection Report 05000483/2006003-02).

Example 8: Following questions by the NRC, CAR 200501092 described that the licensee performed an ineffective cause determination and implemented ineffective corrective actions to prevent recurrence of emergency core cooling system gas voiding, which occurred between June 2004 and January 2005. Specifically, the licensee had not initially recognized that the venting method and procedure used were not sufficient to completely remove any trapped gas (NRC Inspection Report 05000483/2005002-01).

Example 9: The inspectors identified that the licensee had performed a poor evaluation in CAR 200401780 of the possible effects of water intrusion into the turbine-driven auxiliary feedwater pump oil lines. CAR 200406231 identified that the water caused internal corrosion and plugged the turbine's oil line (NRC Inspection Report 05000483/2004005-06).

Historical Issues

Example 1: The resident inspectors determined the licensee performed a less than adequate evaluation of containment heat exchanger postmodification test results in 2001, as documented in CARs 200509450, 200600012 and 200608054 (NRC Inspection Report 05000483/2006003-01).

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 CARs 200602565 and 200608102. Specifically, the licensee repeatedly missed opportunities that had presented themselves in CARs, NRC findings, and vendor technical bulletins to uncover inadequate guidance in Procedure E-1, "Loss of Reactor or Secondary Coolant" (NRC Inspection Report 05000483/2006011-01).

Example 3: During review of CAR 200507866 in October 2006, the team identified that the licensee had failed to evaluate the weight bearing capability of the support legs for the new condensate storage tank floating cover assembly. The licensee documented this error in CAR 200609810. The team concluded this was a minor violation since a subsequent calculation demonstrated the legs would support the forces expected in a design basis accident. The licensee performed the modification to correct foreign material exclusion problems (NRC Inspection Report 05000483/2002007-01).

(c) Assessment - Effectiveness of Corrective Actions

Overall, the licensee implemented effective corrective actions to address conditions adverse to quality and had implemented significant process improvements. However, the team concluded that continued weaknesses existed as reflected in the four current issues examples. The team agreed with the licensee assessment that less than adequate past corrective action program performance resulted in the existence of some latent engineering issues that will continue to be discovered; however, the team determined that the lack of knowledge of design and license basis information also impacted the implementation of effective corrective actions (Examples 1 - 3). The repeated feedwater transients that resulted in reactor trips and repeat safety injection system voiding issues have challenged the credibility of the extent of condition corrective actions and their ability to unearth old problems.

Although the licensee improved its effectiveness review process, the team identified that additional management emphasis and expectations are needed since one of six samples did not meet the guidance in the program procedure (Example 4).

The licensee implemented a number of improvements that increased the effectiveness of the corrective action program: (1) improving program guidance for identifying, processing, evaluating and developing corrective actions; (2) establishing full-time department performance coordinators who assist in processing CARs and performing root cause analyses; (3) developing a root cause manual and providing training to personnel who perform root causes; (4) training managers and supervisors (including Corrective Action Review Board members) on root cause analysis techniques and

human performance evaluation tools; and (5) providing guidance to the screening committee members to improve the consistency of assessing conditions adverse to quality.

The team determined that the licensee was processing changes to the corrective action program to address gaps identified through benchmarking and from outside organization audits. The licensee plans to implement the changes in January 2007. The planned changes include, 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, which will include a quality checklist, and (4) improved guidance for performing immediate operability determinations. The team determined that many of these changes should address some of the concerns identified during this inspection.

Current Issues

Example 1: In CAR 200609075, the licensee identified the failure to take effective corrective actions in response to CAR 200205928, which documented missing sacrificial anodes installed to prevent galvanic corrosion of the emergency diesel generator heat exchangers. Further, 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 had not been adversely affected.

Example 2: CAR 200602995 describes that personnel implemented inappropriate corrective actions for CAR 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 swapover to the containment recirculation sumps. The procedure change failed to prevent a potential runout condition for the component cooling water pumps (NRC Inspection Report 05000483/2006011-02).

Example 3: CAR 200507866 documented a licensee-identified failure to prevent recurrence of a condensate storage tank floating cover assembly design inadequacy. The outer wiper for the cover had cracked, but not separated, because of excessive bending caused by tank level changes.

Example 4: The team determined CAR 200501188, effectiveness review, failed to demonstrate that the corrective actions for CAR 200500354 (replacement of power supply resulted in a reactor trip) were effective. Specifically, the effectiveness review specified corrective actions were completed; however, CAR 200501188 did not provide assurance using specific, measurable criteria that demonstrated success, as required by the corrective action program. The team determined that the actions had been implemented and this deficiency was of minor safety significance.

Historic Issues

Example 1: CAR 200509277 documented that ineffective corrective actions resulted in a repeat overpressure condition on the turbine-driven auxiliary feedwater pump suction piping. Specifically, the licensee had closed CAR 200207808 and had not revised the procedure, as specified in the corrective actions to prevent recurrence (refer to Section 4OA2.e(2)(e)).

Example 2: Quality Assurance issued CAR 200508393 because the line organization had implemented ineffective corrective actions for the relay inspection/replacement for Foxboro N-2AO-L2C-R circuit boards installed in various safety-related systems, which could be susceptible to tin whiskers. Specifically, the licensee closed out CARs 199901536 and 199901540 in 2001 and 2002, respectively, prior to replacing all suspect components described in a 10 CFR Part 21 report. Further, Quality Assurance had identified similar concerns with failure to issue adverse condition CARs when required in CARs 200206979 and 200201095. The team concluded this was a licensee-identified violation for failure to take appropriate corrective actions to prevent recurrence (refer to Section 4OA7).

Example 3: CAR 200503441 documented that if corrective actions had been implemented for a 2004 reactor trip (CAR 200401167) then the March 2005 reactor trip signal could have been prevented. Further, the licensee indicated that poor understanding of the feedwater system capabilities (amount of capacity required at different operating conditions) with respect to plant secondary power was a primary cause in the 2004 lack of feedwater preheating event (NRC Inspection Report 05000483/2005003-02).

Example 4: CAR 200408297 identified that 3600 gallons of water transferred inadvertently from the spent fuel pool to the refueling water storage tank. The licensee did not properly implement the procedure and secure from refueling water storage tank recirculation prior to initiating spent fuel pool cleanup (NRC Inspection Report 05000483/2004005-03).

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, that 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

Overall, the licensee had increased efforts to evaluate existing industry operating experience for relevance to the facility and had entered identified items in the corrective action program. However, the team identified some weakness existed in this area. Specifically, the failure to appropriately process industry operating experience contributed to events during the assessment period (Examples 1 - 3). Generally, the licensee improved in their ability to assess industry operating experience during root cause and apparent cause evaluations of significant conditions adverse to quality and conditions adverse to quality, respectively. The team determined that the licensee had identified during a root cause analysis the inadequate use of industry operating experience (Example 2).

Current Issues

Example 1: CAR 200604492 documented an NRC-identified finding for failure to use industry operating experience, which resulted in the loss of offsite power to switchyard Bus B and an auto start of the Train A emergency diesel generator. The NRC determined that the licensee had opportunities to implement stronger controls in response to several forms of operating experience, including Information Notice 91-81, "Switchyard Problems that Contribute to Loss of Offsite Power." The licensee has implemented an operations standing order to ensure appropriate questions are asked or controls are implemented (NRC Inspection Report 05000483/2006003-05).

Example 2: CAR 200503441 described that a lack of operating experience in plant procedures contributed to a reactor trip caused by insufficient feedwater pre-heating. This CAR referred to two previous reactor trips that had resulted from inadequate feedwater pre-heating and should have resulted in revised procedures. Specifically, CAR 200501949 addressed the March 2005 "lo-lo level on C steam generator reactor trip," which had less than adequate feedwater capacity that made water level control difficult. CAR 200401167 documented a February 2004 reactor trip that had similar issues (NRC Inspection Report 05000483/2005003-02).

Example 3: CARs 200500322 and 200500354 document that failure to use operating experience contributed to a reactor trip that resulted while replacing the RP043 power supply. Although the operating experience information was available in a database, the operating experience was not made available nor was training conducted to prevent the poor maintenance practice that resulted in a reactor trip (NRC Inspection Report 05000483/2005002-04).

Historical Issues

Example 1: In CAR 200603324 the licensee identified that they had failed to effectively review operating experience from 1994. From review of CAR 200601837, which forwarded operating experience related to an event that required maintaining the emergency diesel generator frequency above 60 Hz, the licensee determined that a vender bulletin (NSAL 93-022) had informed licensees that failure to maintain the emergency diesel generator above 60 Hz would require reanalysis of the safety analysis

since the pump performance required emergency diesel generator frequency to not be below 60 Hz. The licensee determined that the failure to process this operating experience resulted in Technical Specification 3.8.1.11.c.4 being non-conservative. The licensee verified that the emergency diesel generator frequency remained at or above 60 Hz during surveillance tests and initiated a change to their Technical Specifications. The team determined that this was a minor violation since the emergency diesel generator frequency had remained above 60 Hz during surveillance testing.

Example 2: CAR 200602565 described that the licensee had repeated opportunities in the form of previous NRC findings and vendor technical bulletins to identify the inadequate guidance in Procedure E-1, "Loss of Reactor or Secondary Coolant," (NRC Inspection Report 05000483/2006011-01).

Example 3: CAR 200601520 documented a licensee-identified failure to properly process operating experience (refer to Section 4OA7). Specifically, the licensee determined during the root cause analysis for CAR 200508393 that they had implemented narrowly focused operating experience reviews during resolution of CAR 200200935, which documented operating experience related to tin whiskers. The team determined that this finding was not reflective of current performance (occurred in 2002). The licensee concluded in CAR 200601520 that this was narrowly focused but not unexpected for resolving an adverse condition during the 2002 time period. The team concluded that the program, people, and process issues being addressed in CAR 200503476 to address robustness of the root cause analysis process would address this identified deficiency.

Example 4: Following questions from the resident inspector, the licensee initiated CAR 200601222 to document that the actions performed in response to CAR 200108041 were ineffective. Specifically, CAR 200108041, which the licensee used to process Information Notice 2001-19, "Additional Actions for Trico Oiler," failed to evaluate all actions discussed within the information notice.

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

Overall, the licensee improved their ability to perform self-critical assessments, audits and evaluations. The team noted several factors that appeared to create these changes; specifically, the licensee increased management focus on corrective action program implementation, human performance issues and improved Quality Assurance

audits; critical evaluations by third party assessments, which included the NRC (Example 3); and increased use of human performance evaluation and event prevention tools. The licensee benchmarked industry best practices to make numerous improvements to the corrective action program. The licensee had incorporated the human performance tools into their daily business processes and 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 audits and surveillances became more self-critical and provided detailed assessments of the reviewed organizations performance. During interviews, the team determined that the licensee began performing the audits to performance criteria that had a goal of excellence such as third party expectations and NRC inspection guidance rather than compliance. The team determined that the number of surveillances performed increased and that the line organizations used this as a tool to improve their performance. Also, the team determined that the licensee increased the number of Quality Assurance auditors by 60 percent (from five to eight) in early 2005.

Because of the number of findings related to weaknesses in evaluation, particularly because of a lack of engineer knowledge of design and license basis information, the team reviewed the actions implemented by engineering to address identified weaknesses. Engineering implemented a revised performance analysis process based upon industry guidance that required identifying gaps, taking corrective actions, and verifying results. The team confirmed that the licensee had provided training to engineers on the safety analysis and design basis for the first time for engineers outside of the safety analysis group. The third quarter Engineering Performance Analysis report identified continuing gaps included as a lack of technical rigor in engineering products and a lack of clear expectations. The licensee identified the gaps as a result of third party and self assessments. In response, the engineering organization implemented corrective actions related to human performance, management oversight, improving quality of products, and adherence to procedures; however, the team concluded that insufficient time has passed to assess the success of these efforts.

The team verified that the licensee had 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.

Current Issues

Example 1: CAR 200601842 documented a licensee-identified effort to perform a focused self-assessment of fourth quarter human performance errors. This occurred following receipt of the NRC Annual Assessment letter. As remedial actions, the licensee requested third party assistance to evaluate the root cause and emphasized event prevention tools related to procedure use and adherence. The licensee implemented corrective actions to prevent recurrence in response to the third party assistance, which identified the following contributors: procedure adherence,

acceptance of poor quality work instructions, and a flawed vision and strategy. The team identified this as an appropriate response to the findings of the assessment.

Example 2: CAR 200503476 documented numerous problems with the root cause analyses performed onsite. The licensee initiated this CAR in response to (1) NRC findings that indicated problems with the quality and depth of root cause analyses and (2) a third party assessment "streaming analysis" performed to identify problems with the root cause analyses. The streaming analysis identified seven specific contributing causes to the inadequate root causes and corrective actions. The team verified that the licensee had taken significant steps to address the identified deficiencies.

Example 3: CAR 200501425 documented the root cause analysis and corrective actions related to the Human Performance Substantive cross-cutting issue identified by the NRC during the 2005 Annual Assessment. The licensee identified the following root causes: (1) unclear picture of human performance excellence, (2) insufficient supervisor and manager oversight, (3) ownership of the corrective action program, and (4) inadequate use of change management. The team verified that the licensee had initiated changes at all levels of the organization to address the identified deficiencies.

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

(1) Inspection Scope

The team reviewed the 2005 Nuclear Safety Culture Assessment results, including the redacted comments, and met with the Superintendent, Employee Concerns, to discuss the plans for addressing the issues revealed by the survey. Also, the team conducted formal interviews with an organizational cross-section of 30 site personnel and informal interviews with other members of your staff to assess their willingness to raise safety issues and use the corrective action program. These interviews assessed whether conditions existed that would challenge the establishment of a safety-conscience work environment.

(2) Assessment

The team concluded that the licensee established an acceptable and improving safety-conscious work environment. However, some indication exists that additional effort is needed to encourage the free flow of information to ensure safety issues are resolved promptly.

The 2005 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 team verified that the licensee had implemented actions to resolve the identified areas.

From review of the redacted comments from the 2005 Nuclear Safety Culture Assessment, the team found, at that time, several individuals believed significant impediments existed to raising safety issues and several individuals had expressed concerns about the corrective action program. In mid-2006, the team identified some cases where management did not effectively receive organizational input, which adversely affected safety related decisions. However, in all but one case, the informal interviews conducted during this inspection were very positive. Nearly every interviewee indicated they had recent training on safety-conscious work environment and understood and agreed with its purpose. However, one individual had a perception that a chilled work environment existed at Callaway.

The team determined that the licensee implemented several initiatives to improve the safety-conscious work environment and the implementation of the corrective action program. The licensee has plans to conduct a full assessment of both their Nuclear Safety Culture and General Culture and Work Environment in Spring 2007 that will provide updated information and a statistical sampling of the safety culture at Callaway.

The team confirmed that the statistics used to monitor the effectiveness of the Employee Concerns Program provided quantitative evidence that supported the results of the 2005 Nuclear Safety Culture Assessment and demonstrated an increased staff familiarity with the employee concerns program. The team assessed the visibility of the methods used to advertise the employee concerns program and found them to be acceptable. The team determined that the licensee has seen a significant decrease in the number of formal allegations submitted to the NRC from Calendar Year 2005 to Calendar Year 2006.

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

(1) Inspection Scope

During the reviews described in Sections 4OA2.a(2)(a), 4OA2.a(2)(b) and4OA2.a(2)(c), the team identified the following findings.

(2) Findings and Observations

(a) Failure to initiate Callaway Action Requests

Introduction. The team identified two examples of a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for failure to initiate Callaway Action Requests for conditions adverse to quality that affected the reliability of mitigating systems. Specifically, on August 17, 2005, and on May 30, 2006, the licensee discovered a high point air trap in the Train A safety injection discharge piping and decreasing water level in Steam Generators A and D; however, the licensee failed to enter these conditions adverse to quality into their corrective action program. The water in the main steam line contributed to a water hammer and the void had the potential to impact operability of the safety injection system. The licensee entered this deficiency into their corrective action program as CAR 200609812.

Description. On two separate occasions, the licensee failed to initiate a CAR for known conditions adverse to quality. In each instance, had personnel initiated a CAR, a subsequent event or condition may have been mitigated. Specifically, the first instance occurred during a plant startup from a forced outage. On May 12, 2006, outage control center personnel had informally documented that both Steam Generator A and Steam Generator D had decreasing water levels. Personnel documented this as a single line item in a list of several actions. The notation indicated that Steam Generator A and D levels were dropping. After determining a cracked open isolation valve caused the level decrease in Steam Generator D, outage control center personnel closed the action on the list for both steam generators. The failure to identify a specific cause for the decreasing level in Steam Generator A, which was later determined to be increased steaming that reduced the water level, contributed to a subsequent water hammer.

As part of the corrective actions for the inadequate system design, the licensee initiated Job 05104004 to survey the remaining horizontal sections of the safety injection system Train A discharge piping, Train B discharge piping, and the common discharge piping. From discussions with the engineers, the team determined that, on August 17, 2005, the licensee had identified a high point air trap on Line EM-006-CCB-4" at the 1994' elevation. The licensee did not document this condition adverse to quality in CAR 200501092 and did not initiate a new CAR to document this deficiency.

Analysis. The performance deficiency involved the failure to initiate corrective action documents for identified conditions adverse to quality, as required by their program. This finding is more than minor because it is associated with the equipment performance attribute of the mitigating systems cornerstone and affects the associated cornerstone objective to ensure the reliability and availability of systems that respond to initiating events. Using Manual Chapter 0609, “Significance Determination Process,” Phase 1 worksheet, the finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone, was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. The finding has cross-cutting aspects related to problem identification and resolution, in that, personnel did not identify issues at a low threshold and in a timely manner commensurate with their safety significance.

Enforcement. Part 50 of Title 10 of the Code of Federal Regulations, Appendix B, Criterion XVI, requires that measures be taken to assure that conditions adverse to quality are promptly identified and corrected. Contrary to the above, licensee personnel failed to report two separate conditions that reduced plant safety. Specifically, on August 17, 2005, personnel failed to initiate a CAR after identifying a high point air trap in a horizontal discharge line that could contain undesirable gases, which could have impacted operability of the safety injection train. On May 12, 2006, personnel failed to initiate a CAR after identifying a decreasing level in Steam Generators A and D, which contributed to a subsequent Main Steam Line A waterhammer. Because this finding is of very low safety significance and was entered into the corrective action program (CAR 200609812), this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000483/2006012-01, Failure to initiate Callaway Action Requests).

(b) Failure to identify conditions adverse to quality

Introduction. The team identified two examples of a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion V, and the corrective action program because licensee personnel failed to recognize and to identify two separate examples as conditions adverse to quality. Specifically, on April 13, 2006, and on October 17, 2006, licensee personnel did not identify blocked containment cooler tubes and a dirty emergency diesel generator turbocharger air intake filter, respectively, as conditions adverse to quality. Failure to recognize these conditions as degraded and identify them as conditions adverse to quality delayed the immediate evaluation of operability and implementation of corrective actions. The licensee entered this deficiency into their corrective action program as CAR 200609813.

Description. The team determined that the licensee had initiated two Action Notice CARs describing degraded conditions; however, the licensee failed to identify the degraded conditions as conditions adverse to quality in accordance with 10 CFR Part 50, Appendix B, Criterion V, and their corrective action program.

On April 13, 2006, the licensee initiated Action Notice CAR 200602989 to document that thermography of a containment cooler identified 16 percent tube blockage, a degraded condition. This action notice CAR prescribed increasing the frequency for flushing the tube side of these coolers and then verifying, with thermography, that the flushing cleared the tubes. Procedure APA-ZZ-00500, "Corrective Action Program," Revision 41, Step 3.1, required personnel to identify and report conditions adverse to quality and required personnel to immediately notify the Shift Manager or a supervisor upon discovery of a condition believed to have an immediate impact on operability. Procedure APA-ZZ-500 also defined nonconformance and degraded conditions as conditions adverse to quality. Since personnel categorized the condition as an Action Notice CAR, not as an adverse condition, neither the follow up recommended thermography nor notification of the Shift Manager for immediate operability determination occurred.

On October 17, 2006, the team identified a significant amount of dirt accumulation on the outside screens for the Train A emergency diesel generator air intake filter. In response to questions, the licensee initiated Action Notice CAR 200608806 to "evaluate" the as-found condition. During attendance at a subsequent screening meeting, the team determined that the licensee had no plans to evaluate operabililty for this degraded filter since this was an Action Notice CAR not a condition adverse to quality, as specified in Procedure APA-ZZ-00500.

In response to NRC questions, the licensee determined that personnel had discontinued performing preventive maintenance of the emergency diesel intake filters in 1999 without having a documented technical basis. The team determined that licensee personnel remained unfamiliar with vendor recommendations associated with oil changes, sludge levels, and viscosity. The licensee established condition-based maintenance triggered by the air intake differential pressure and the oil bath level. However, the team determined the licensee acceptance criteria for differential pressure exceeded that allowed by the vendor. The oil type recommended by the vendor did not meet the viscosity levels recommended in their own manual. Additionally, the vendor

recommended tracking oil bath sludge levels as an indicator of when to replace the oil, but the licensee had not documented that they monitored oil bath sludge levels. Subsequently, the licensee sampled the oil on November 3 and 7, 2006, determined that the oil was very dark but sludge levels remained acceptably low. The licensee determined that the viscosity results had not changed since the last measurement several years earlier.

Analysis. The performance deficiency involved failure to promptly identify and correct conditions adverse to quality. The inappropriate classification of Callaway Action Requests 200602989 and 200608806 as Action Notice CARs delayed and prevented actions required by the corrective action program. This finding is greater than minor because a later evaluation by the licensee determined that safety related equipment had been adversely affected. This example is similar to Manual Chapter 0612, Appendix E, Example 4.a. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, this finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. The finding has cross-cutting aspects related to problem identification and resolution, in that, personnel did not identify issues at a low threshold and in a timely manner commensurate with their safety significance.

Enforcement. Part 50 of Title 10 of the Code of Federal Regulations, Appendix B, Criterion V, requires that activities affecting quality shall be prescribed by documented procedures appropriate to the circumstances and shall be accomplished in accordance with these procedures. Procedure APA-ZZ-00500, Step 3.1, required personnel to identify and report conditions adverse to quality. Contrary to the above, licensee personnel failed to report two separate degraded conditions, as conditions adverse to quality that could have impacted plant safety. Specifically, on April 13, 2006, personnel did not identify 16 percent blocked containment cooler tubes as degraded. On October 17, 2006, personnel did not identify a dirty emergency diesel generator air intake filter as degraded. Because this finding is of very low safety significance and was entered into the corrective action program (CAR 200609813), this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000483/2006012-02, Failure to identify conditions adverse to quality).

(c) Inadequate operability determination of a degraded main steam isolation valve

Introduction. The team identified a Green noncited violation of Technical Specification 3.7.2, after operations personnel failed to enter and implement required Technical Specification 3.7.2 actions. Specifically, the licensee had performed an inadequate operability determination related to a degraded main steam isolation valve that resulted in exceeding the allowed Technical Specifications out-of-service time between December 29 and 31, 2004. On October 19, 2006, the NRC determined that the licensee should have declared the main steam isolation valve and its actuation channel inoperable after removing one of two hydraulic actuators from service. The licensee entered this deficiency into their corrective action program as CAR 200609233.

Description. Between December 29 and 31, 2004, for 46 hours, the team identified that the licensee failed to declare a main steam isolation valve inoperable after removing one of two actuation trains from service for corrective maintenance. The licensee had removed the hydraulic actuator from service for greater than the Technical Specification 3.7.2 and Technical Specification 3.3.2 allowed out-of-service times for the main steam isolation valve and main steam isolation valve actuation channel, respectively. Operability Determination 200500238 for the degraded condition concluded that the main steam isolation valve and actuation channel remained operable with the actuator removed from service.

The NRC documented their review of the Callaway main steam isolation valve requirements in, "Operability Determination for the Callaway Plant Technical Specifications Requirements When One Main Steam Isolation Valve Actuator Train is Removed from Service," dated October 19, 2006, (ADAMS ML0617303960). The NRC concluded that the licensee should have declared the main steam isolation valve and its actuation channel inoperable when removing the actuator from service. The NRC concluded this based upon three factors related to the main steam isolation valve: (1) key assumptions in the accident analysis were not preserved when the actuator was removed from service; (2) the actuator was required attendant equipment for the actuation channel to perform the intended safety function; and (3) Technical Specification Surveillance Requirement 3.7.2.2 could not be met when the actuator was removed from service

Analysis. The performance deficiency involved the failure to perform an adequate operability evaluation of degraded plant equipment. As a result, the licensee failed to comply with the Technical Specifications. This finding is greater than minor because the configuration control attribute of the barrier integrity cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radio nuclide releases caused by accidents or events is affected. The team used the "At Power Significance Determination Process," of Manual Chapter 0609. The team concluded that a Phase 2 analysis was required because this finding affects both the fuel and containment barriers.

The team performed a Phase 2 analysis using the "Risk-Informed Inspection Notebook for Callaway Nuclear Generating Station Unit 1," Revision 2. The team assumed that (1) one of two actuator trains was unavailable on one main steam isolation valve for less than 3 days and (2) the degraded actuator did not reduce the remaining main steam isolation valve mitigation capability credit to less than full mitigation credit. Based on the results of the Phase 2 analysis, this finding is determined to have very low safety significance. This finding has a cross-cutting aspect in the area of problem identification and resolution because licensee did not thoroughly and correctly evaluate the operability of the degraded main steam isolation valve.

Enforcement. Technical Specification 3.7.2 required the licensee to either restore a failed main steam isolation valve to operable within 8 hours or be in Mode 2 in the next 6 hours. Technical Specification 3.3.2 required two trains of instrument logic to be operable to perform the steam line isolation safety function. Contrary to the above, the licensee failed to comply with the Technical Specification required actions and failed to restore the failed Main Steam Isolation Valve C and its degraded actuation train to

operable within the allowed outage times. The valve was inoperable for 46 hours between December 29 and 31, 2004. Because this finding is of very low safety significance and was entered into the corrective action program (CAR 200609233), this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000483/2006012-03, Inadequate operability determination of a degraded main steam isolation valve).

(d) Failure to effectively implement actions to prevent recurrence

Introduction. A self-revealing, noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, resulted from the failure to correct, and preclude repetition of (evaluate extent of condition), a significant condition adverse to quality related to identification of high spots in horizontal safety injection system discharge piping. Specifically, the licensee failed to identify all high spots in the susceptible discharge piping in February 2005; consequently, a modification did not prevent recurrence of voids collecting in high spots. The licensee entered this deficiency into their corrective action program as CAR 200608644.

Description. On February 18, 2005, the licensee initiated CAR 200501092 to document an adverse trend related to void formation in the high pressure safety injection system. In addition, NRC issued a 10 CFR Part 50, Criterion XVI, noncited violation because the licensee failed to implement appropriate corrective actions to preclude repetition of the void formation in the safety injection system, a significant condition adverse to quality. The licensee also addressed the corrective actions for this noncited violation in CAR 200501092. The licensee attributed the root cause to inadequate system design.

The licensee surveyed a 53-foot horizontal span at the 1995'-9" elevation on the discharge of Safety Injection Pump PEM01A. Using ultrasonic test methods, the licensee verified the presence of voids at the identified high points in the line. The licensee performed an ultrasonic survey of 3 feet of pipe on the horizontal 1994' elevation immediately upstream of the elbow that transitions to the vertical pipe going towards the 1995'-9" elevation. Since the ultrasonic survey did not identify any gas voids, the licensee concluded the entire 43-foot 1994' elevation horizontal span remained water solid. The licensee developed Modification Package 05-1004A to install two vents at high points on a 53-foot horizontal pipe run on the 1995'-9" elevation but when developing the modification that implemented the corrective actions failed to consider that a similar high point may exist in other horizontal pipes.

On October 11, 2006, during ultrasonic testing as part of Surveillance 06528696, engineers identified a gas void in Line EM-006-CCB-4" located on the 1994' elevation horizontal 43-foot span. The engineers calculated the combined void volume for the identified gas void and additional voids at previously installed high point vents (Valves EMV028 and EMV029) as 0.6 ft^3. The operability determination in CAR 200608466 described that the voiding resulted from inability to fully vent the discharge piping for Safety Injection Pump PEM01A because localized high spots trapped air, which the licensee introduced during the recent replacement of Valve EM8853A, Safety Injection Pump A discharge relief valve. The team determined that trapped gases allowed to reside at a high point combined with the introduction of

additional gases between Technical Specification surveillances could result in an inoperable train.

Analysis. The performance deficiency involved the failure to effectively evaluate all susceptible points in the Train A safety injection discharge piping. The finding is more than minor because it is associated with the equipment performance attribute of the mitigating systems cornerstone and affects the cornerstone objective of ensuring the availability of systems that respond to initiating events. The failure of the design change affected the reliability of the safety injection system. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. This finding has a cross-cutting aspect related to problem identification and resolution, in that, the licensee did not thoroughly evaluate the voiding problems such that the resolutions addressed the extent of conditions.

Enforcement. Part 50 of Title 10 of the Code of Federal Regulations, Appendix B, Criterion XVI, requires that measures be taken to preclude recurrence of significant conditions adverse to quality. Contrary to the above, the licensee failed to implement timely, effective actions to prevent recurrence of voids collecting, as a result of high spots in horizontal piping in the Train A safety injection discharge line. Specifically, while implementing corrective actions for CAR 200501092, personnel failed to identify and correct the a high point in a susceptible horizontal line even after identifying high spots in a horizontal portion of the same discharge line. Because this finding is of very low safety significance and was entered into the corrective action program (CAR 200608644), this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000483/2006012-04, Failure to effectively implement actions to prevent recurrence).

(e) Failure to promptly correct a condition adverse to quality

Introduction. A self revealing Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI resulted after operations personnel failed to implement corrective actions. Specifically, the licensee failed to modify Procedure OSP-AL-V0003, "Auxiliary Feedwater Pump Discharge Check Valve (ALV0054) Closure Test," to ensure that upstream piping would be vented prior to performing the test to prevent overpressurizing the turbine-driven auxiliary feedwater pump suction pipe. The licensee entered this deficiency into their corrective action program as CAR 200509277.

Description. On November 11, 2005, while in Mode 5, the licensee performed the Procedure OSP-AL-V0003 test of a discharge check valve. Because of inadequate venting of upstream turbine-driven auxiliary feedwater pump piping, the pressure in the suction piping reached 800 psig, which exceeded the 150 psig pressure rating. The licensee documented this as a significant condition adverse to quality in CAR 200509277. The licensee replaced the pump oil cooler and performed various other checks for pressure related damage, including the impact of the pipe overstress.

The licensee determined that, on November 20, 2002, they had experienced a similar over-pressure event while in Mode 5 performing Procedure OSP-AL-V0003. The licensee documented this as an adverse condition in CAR 200207808 and specified that operations would revise the surveillance procedure to ensure the upstream piping would be vented, as a corrective action to prevent recurrence. The licensee determined following the second event that they failed to revise the procedure as prescribed.

Analysis. The performance deficiency involved the failure to change a procedure as recommended in a corrective action to prevent recurrence. This finding associated with failure to implement corrective action is greater than minor because if left uncorrected the finding would become a more significant safety concern. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. This finding has a cross-cutting aspect in the area of human performance associated with resources because the licensee did not ensure complete, accurate, up-to-date procedures were available to plant operators.

Enforcement. Part 50 of Title 10 of the Code of Federal Regulations, Appendix B, Criterion XVI requires that measures be taken to assure that conditions adverse to quality are promptly identified and corrected. Contrary to the above, after the turbine-driven auxiliary feedwater suction piping was overpressurized on November 11, 2005, the licensee determined that they failed to implement corrective actions specified in CAR 200207808. Specifically, operations failed to revise Procedure OSP-AL-V0003 in response to a previous overpressurization event. Because this finding is of very low safety significance and was entered into the corrective action program (CAR 200509277), this violation is being treated as a noncited violation in accordance with Section VI.A.1 of the Enforcement Policy (NCV 05000483/2006012-05, Failure to promptly correct a condition adverse to quality).

4OA5 Other Activities

(Closed) Unresolved Item 05000483/2005002-05: Main steam isolation valve operability

The NRC issued this unresolved item pending a determination whether both main steam isolation valve actuator trains are required attendant equipment for main steam isolation valve operability (refer to NRC Inspection Report 05000483/2005002, Section 1R15).

The team documented the resolution of this issue in Section 4OA2.e(2)(c) of this inspection report.

4OA6 Exit Meeting

On November 30, 2006, the team presented their inspection results to Mr. C. D. Naslund, Senior Vice President and Chief Nuclear Officer, and other members of his staff who acknowledged the findings. The inspectors returned all proprietary and confidential information provided during the inspection.

4OA7 Licensee Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and were violations of NRC requirements that met the criteria of Section IV of the NRC Enforcement Policy for being dispositioned as noncited violations.

- Part 50 of Title 10 of the Code of Federal Regulations, Appendix B, Criterion V, requires the licensee to establish and implement procedures that affect quality. Procedure APA-ZZ-00500 specified requirements for documenting conditions adverse to quality. Contrary to these requirements, the licensee failed to reclassify Action Notice CAR 200506433 as a condition adverse to quality after they had found evidence of tin whiskers, an adverse condition that could affect plant reliability, in safety-related plant equipment. This is a performance deficiency for failure to identify a degraded condition as a condition adverse to quality. This finding is of very low safety significance because the condition represented a degradation in reliability of a mitigating system, but no actual equipment failures occurred. On November 23, 2005, Quality Assurance issued CAR 200509623 to document the deficiency.

- Part 50 of Title10 of the Code of Federal Regulations, Appendix B, Criterion V, requires the licensee to establish and implement procedures that affect quality. Procedure APA-ZZ-00500 specified requirements for implementing corrective actions for conditions adverse to quality. Contrary to the above, the licensee implemented ineffective corrective actions for tin whiskers related to the relay inspection/replacement for Foxboro N-2AO-L2C-R circuit boards. Specifically, the licensee closed out CARs 199901536 and 199901540 in 2001 and 2002, respectively, prior to replacing all suspect components described in a 10 CFR Part 21 report. The licensee will complete all inspections in Spring 2007. This is a performance deficiency for failure to implement corrective actions. This finding is of very low safety significance because the condition represented a degradation in the capability of a mitigating system, but no actual failures occurred. The licensee documented the failure to implement corrective actions in CAR 200601520 (referenced by CAR 200508393).

Attachment: Supplemental Information

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

B. Barton, Assistant Manager, Operations
G. Belchik, Supervisor, Operations
J. Englebrecht, System Engineer
A. Heflin, Vice President Nuclear
T. Herrmann, Vice President Engineering
D. Hollabaugh, Superintendent Employee Concerns
B. Huhmann, Supervising Engineer, Nuclear Engineering Systems, Mechanical
J. Imhoff, System Engineer
L. Kanuckel, Manager, Quality Assurance
B. Miller, Supervisor, Performance Improvement
T. Moser, Manager, Plant Engineering
C. Naslund, Senior Vice President and Chief Nuclear Officer
E. Olsen, Superintendent, Performance Improvement
S. Petzel, Engineer, Regulatory Affairs
D. Rickard, Supervisor, Corrective Action Program
B. Sprock, System Engineer
L. Thibault, Director, Plant Operations
R. Wink, Supervisor, Engineering

NRC

M. Peck, Senior Resident Inspector, Callaway Plant

LIST OF ITEMS OPENED AND CLOSED

Opened and Closed

05000483/2006012-01	NCV	Failure to initiate Callaway Action Request (Section 4OA2.e(2)(a))
05000483/2006012-02	NCV	Failure to identify conditions adverse to quality Section 4OA2.e(2)(b))
05000483/2006012-03	NCV	Inadequate operability determination of a degraded main steam isolation valve (Section 4OA2.e(2)(c))
05000483/2006012-04	NCV	Failure to effectively implement actions to prevent recurrence (Section 4OA2.e(2)(d))
05000483/2006012-05	NCV	Failure to promptly correct a condition adverse to quality (Section 4OA2.e(2)(e))

Closed

05000483/2005002-05 URI Main steam isolation valve operability (Section 4OA5)

LIST OF DOCUMENTS REVIEWED

Procedures

APA-ZZ-00305, “Facilities Service and Maintenance,” Revision 1

APA-ZZ-00500, “Corrective Action Program,” Revision 41

APA-ZZ-00500, Appendix 1, “Prompt Operability and Prompt Functionality Determinations,” Revision 1

APA-ZZ-00500, Appendix 5, “Maintenance Rule,” Revision 0

APA-ZZ-00500, Appendix 7, “Effectiveness Reviews,” Revision 1

APA-ZZ-00500, Appendix 11, “Tracking of Mode Restraints and Timeliness Justification,” Revision 0

APA-ZZ-0500A, “Action Notice Program,” Revision 0

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, Appendix E, “Operating Experience,” Revision 1

EDP-ZZ-01131, “Callaway Plant Health Program,” Revision 6

EDP-ZZ-04023, “Calculations,” Revision 20

EDP-ZZ-04032, “Design Input Control,” Revision 20

EDP-ZZ-05000, “Engineering Product Quality,” Revision 1

LDP-ZZ-00500, “Corrective Action Review Board,” Revision 7

OSP-AL-V0003, “Auxiliary Feedwater Discharge Check Valve Closure Test,” Revision 8

OTN-NE-0001A, Addendum 4, “Inoperable Diesel Room Ventilation Supply Fan,” Revision 0

Drawings

8600-X-89668, “Cathodic Protection Plan Emergency Fuel Oil Storage Tanks,” Revision 2

8600-X-89745, “Site Plan Cathodic Protection Equipment Sheet 1 of 2,” Revision 19

8600-X-89746, “Site Plan Cathodic Protection Equipment Sheet 2 of 2,” Revision 15

E-1026-00003, “Cathodic Protection System,” Revision 5

E-21001(Q), “Main Single Line Diagram,” Revision 12

E-21005(Q), “List of Loads Supplied by Emergency Diesel Generator,” Revision 30

E-23GM01(Q), “Schematic Diagram Diesel Generator Ventilation Supply Fan,” Revision 7

E-23GM04(Q), “Schematic Diagram Diesel Generator Building Exhaust Damper,” Revision 1

E-23NE01(Q), “Standby Generation System, Three Line Meter and Relay Diagram,” Revision 12

E-23NE02(Q), “Standby Generation System, Three Line Meter and Relay Diagram,” Revision 12

M-22-EF01(Q), “Piping & Instrumentation Diagram Essential Service Water System,” Revisions 52 and 56

M-22GM01(Q), “Piping & Instrumentation Diagram Diesel Generator Building HVAC,” Revision 2

M-045211(Q), “HVAC Hanger lcations diesel generator building,” Revision 9

TDB-001 pages 42 and 43, “Condensate Storage Tank Construction”

Tank M-109 File number 12977-1, “Ultraflote Cover Drawing”

Jobs

P698089	P698095	P698097	P698133	P698134	P699239
4501208	4501212	4503612	5511194	5513489	

Callaway Action Requests

199400082	200406231	200501949	200507092	200600685	200605143
199901536	200406590	200501953	200507471	200600843	200605224
199901540	200406887	200501985	200507546	200601177	200605252
200107024	200407231	200501989	200507591	200601222	200605279
200108041	200407258	200502152	200507593	200601437	200605338
200200094	200407284	200502204	200507635	200601520	200605346
200201095	200407700	200502205	200507670	200601837	200605357
200202958	200407977	200502250	200507693	200601898	200605447
200206979	200408028	200502251	200507711	200601924	200605466
200207808	200408232	200502282	200508074	200602121	200605969
200302806	200408297	200502475	200508123	200602309	200606131
200308244	200408337	200502548	200508393	200602565	200606191
200400047	200408342	200502768	200508473	200602886	200606432
200400717	200408368	200502807	200508584	200602893	200606433
200400798	200408429	200502949	200508587	200602954	200606767
200401403	200408693	200502995	200508630	200602989	200606913
200401667	200408882	200503354	200508826	200602995	200606930
200401780	200409278	200503431	200509143	200603055	200607188
200401869	200409284	200503476	200509189	200603324	200607461
200402460	200409571	200503796	200509277	200603636	200607581
200402529	200500058	200503821	200509374	200603734	200607742
200402640	200500064	200503956	200509450	200603828	200607985
200402785	200500073	200504302	200509487	200603853	200608051
200403443	200500238	200504370	200509543	200603906	200608053
200403698	200500322	200504722	200509623	200604247	200608054
200403817	200500329	200504773	200509693	200604255	200608055
200403850	200500354	200505194	200509849	200604360	200608101
200403870	200500543	200505244	200509984	200604478	200608102
200403912	200500584	200505279	200510162	200604492	200608398
200403933	200500732	200505360	200510219	200604637	200608439
200403988	200500746	200505521	200510325	200604640	200608463
200404130	200500865	200505599	200600012	200604715	200608466
200404815	200500880	200505656	200600074	200604724	200608480
200404836	200501092	200505801	200600321	200604772	200608577
200405020	200501153	200506098	200600332	200604776	200608614
200405567	200501188	200506433	200600527	200604854	200608806
200405684	200501378	200506570	200600553	200604991	200608948
200406022	200501425	200506779	200600601	200605017	200609233
200406063	200501838				

Requests for Resolution

23345A	200503398	200503400	200503401	200508587

Calculations

03-89-12F, “HVAC Duct Support Details,” Revision 0
AL-22, “Auxiliary Feedwater - CST Level Setpoints,” File number A170.0166
EE-003, “Electrical Load Growth,” Revision 3
ZZ-006, “Engineering Changes,” Revision 4
ZZ-179, “AC Bus Load List,” Revision 6

Audits, Self-Assessments and Surveillances

AP04-013, “Emergency Preparedness,” dated December 9, 2004

AP05-002, “Operations,” dated April 14, 2005

AP05-005, “Chemistry,” dated June 27, 2005

AP05-007, “Maintenance,” dated August 8, 2005

AP06-001, “Radiation Protection,” dated March 10, 2006

AP06-005, “Fire Protection,” dated April 27, 2006

AP06-006, “Design Control,” dated July 31, 2006

AP06-014, “Emergency Preparedness,” dated October 3, 2006

SA04-NE-F02, “Callaway Maintenance Rule Program,” dated November 6, 2004

SA04-PI-S01, “Operating Experience Program Performance Indicators,”
dated January 21, 2004

SA04-PI-S06, “OE is Not Being Included in Work Packages for Pre-Job Briefs,”
dated September 28, 2004

SA05-QA-S02, “Evaluate Employee Concerns Program,” dated March 29, 2005

SA05-PI-S04, “The Root Cause Analysis Culture,” dated May 12, 2005

SA05-PI-S02, “Operating Experience Documentation in Work Packages,” dated April 20, 2005

SP04-021, “Assess the Removal and Replacement of the Feedwater Isolation Valve Actuators,”
dated June 18, 2004

SP04-022, “Assess the MDAFP Automatic Recirculation Control Check Valve and MDAFP Seal Modifications (MP 02-1018A and 02-1001A),” dated June 18, 2004

SP04-026, “Control Room Operations and Turnovers,” dated June 10, 2004

SP04-041, “Verify work performed in response to high inboard bearing temperature on the TDAFP identifies and corrects the cause(s) prior to return to service,” dated August 20, 2004

SP05-003, “Plant Operations, Organizational Support After a Reactor Trip,” dated February 10, 2005

SP05-016, “Conduct of Engineering Review,” dated May 6, 2005

SP05-019, “Worker Protection Local Controls,” dated May 25, 2005

SP05-029, “Reactor Startup,” dated December 6, 2005

SP05-044, “Refuel 14 Work Activities on the Turbine Driven Auxiliary Feed Pump,” dated November 23, 2005

SP05-056, “Tin Whiskers,” dated November 29, 2005

SP05-077, “Emergent Issues,” dated November 21, 2005

SP06-003, “Training Deficiencies with Reactor Trips,” dated January 30, 2006

SP06-004, “Work Package Improvement,” dated January 18, 2006

SP06-016, “Operational Safety,” dated May 2, 2006

SP06-017, “Leadership Management Priorities and Vision,” dated May 25, 2006

SP06-026, “Control Room Activities during Forced Outage 59,” dated June 13, 2006

SP06-029, “High Pressure Turbine Blade Failure,” dated June 14, 2006

SP06-032, “QA Review of Operational Focus Index,” dated July 27, 2006

Safety Conscious Work Environment

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

NRC 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

Understanding SCWE - A Handbook on Safety Conscious Work Environment

Lesson Plan T51.0092.S, “Avoiding ‘Whistleblower Claims’ 10 CFR 50.7 Employee Protection & Update Policies,” dated April 19, 2006

Employee Concerns Program Pamphlet

Avoiding Retaliation Claims (10 CFR 50.7)

Various Keeping You Posted E-mails related to the 2005 Safety Culture Survey (dated 03/18/05, 04/28/05, 05/12/05, and 06/23/05)

2003 and 2005 Safety Culture Survey

As the Turbine Turns Articles on the 2005 Safety Culture (dated 03/17/05, 03/31/05, 04/14/05, 04/14/05, and 04/28/05)

NRC 2005 Allegation Trends Report evaluation related to the Callaway Plant

2005 Employee Concerns contact summary and classification,

Callaway Plant Employee Concerns Program Contact Summaries for CY 2004, 2005, and 2006

Callaway Plant Keyword (Anonymous and Employee Concern) Search Results from 2002 to 2006

Miscellaneous

EDP-ZZ-01112, "Heat Exchanger Predictive Performance Manual," Revision 11

EDP-ZZ-04070, "Reactor Coolant System Materials Degradation Management Plan," Revision 0

Letter DC 94-002, "Emergency Diesel Generator Low Speed - ECCS Low Flow," dated January 24, 1994

Letter SLNRC 84-0089, "SNUPPS Technical Specifications Reactor Systems Branch Issues," dated May 31, 1984

Regulatory Guide 1.105, "Instrument Setpoints," Revision 1

Lesson Plan for Standby Generation KJ/NE

Electrical Load Tracking History for past 5 Years on Diesel Buses

MP 99-1044, "Replace the Emergency Diesel Generator Governor Control System," Revision A

Diesel Fuel Oil Storage Tanks voltage readings sheet

Final Safety Analysis Report Chapter 8

Technical Specification 3.8, "AC Sources-Operating/Shutdown"

Technical Report entitled, "Component Cooling System Heat Exchanger Test Uncertainty," from Charles Bowman Associates, Inc., dated February 2006

Letter ULNRC- 2146, "Response to Generic Letter 89-13 Service Water System Problems Affecting Safety - Related Equipment," dated January 29, 1990

American Instituted of Steel Construction - Axial Compression Through Centroidal Axis, Chapter E

Raw Water Inspection Report, dated December 11, 2003

Essential Service Water pipe replacement timeline through 2008

CAR screening reports dated October 20, 23, 24, 25, and 26, 2006

Engineering department trend graphs, performance indicators, and performance analysis reports for the first, second, and third quarters 2006

Performance Improvement Group, including corrective action program, trend graphs, performance indicators and quarterly performance analysis reports from April 2004 through October 2006

Breaking through Denial Presentation dated May 2006

Performance Improvement 2006 Business Plan

Event Prevention Through Worker Engagement - Workbook, dated May 2005

Information Request

September 11, 2006
Callaway Problem Identification and Resolution Inspection
(IP 71152; Inspection Report 05000483/2006-12)

The inspection will cover the period of April 3, 2004 to November 30, 2006. All requested information should be limited to this period unless otherwise specified. The information may be provided in either electronic or paper media or a combination of these. Information provided in electronic media may be in the form of e-mail attachment(s), CDs, thumb drives, or 3 ½ inch floppy disks. The agency's text editing software is Corel WordPerfect 10, Presentations, and Quattro Pro; however, we have document viewing capability for MS Word, Excel, Power Point, and Adobe Acrobat (.pdf) text files.

Please provide the following information to David Dumbacher at the Callaway Plant Resident Office by September 18, 2006.

Note: On summary lists please include a description of problem, status, initiating date, and owner organization.

1. Summary list of all Callaway Action Requests (CARS) of significant conditions adverse to quality (Significant level 1 and 2) opened or closed since 4/3/2004

2. Summary list of all CARS which were generated since 4/3/2004

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 4/3/2004

5. List of all root cause analyses completed since 4/3/2004

6. List of root cause analyses planned, but not complete at end of the period

7. List of all apparent cause analyses completed since 4/3/2004

8. List of plant safety issues raised or addressed by the employee concerns program since 4/3/2004

9. List of action items generated or addressed by the plant safety review committees since 4/3/2004

10. All quality assurance audits and surveillances of corrective action activities completed since 4/3/2004

11. A list of all quality assurance audits and surveillances scheduled for completion since 4/3/2004, but which were not completed

12. All corrective action activity reports, functional area self-assessments, and non-NRC third party assessments completed since 4/3/2004

13. Corrective action performance trending/tracking information generated since 4/3/2004 and broken down by functional organization

14. Current revisions of corrective action program procedures for: Callaway Action Request, 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 4/3/2004

16. Action requests or other actions generated since 4/3/2004 for each of the items below:

    a. Part 21 Reports
    b. [Applicable] NRC Information Notices
    c. All LERs issued by AmerenUE
    d. NCVs and Violations issued to AmerenUE (including licensee identified violations)

(17) Safeguards event logs for the period

(18) Radiation protection event logs

(19) Current system health reports or similar information

(20) Current predictive performance summary reports or similar information

(21) Corrective action effectiveness review reports generated since 4/3/2004

(22) List of risk significant components and systems

(23) List of actions done and/or in the Human Performance Improvement Plan since the last PIR inspection

(24) Outage maintenance that was not done for whatever reason.

(25) Any rework of maintenance performed from last outage

(26) Full CAR, marked up P&ID showing progress, Erosion / corrosion procedures and list of actions associated with the ESW pipe replacement plan.

(27) Electrical load tracking program procedures and history of changes to essential busses (five years)

(28) Full CAR detailing check valve induced vibration associated with the Containment Spray pumps since 4/3/2004

Callaway Plant PI&R Inspection
Inspection Report 2006012
10/16 - 11/30/2006

G. Pick (4660)

PIM NRC NA NA NA November 30, 2006 71152B
Biennial PI&R Assessment.

The team reviewed 230 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 concluded that, generally, the licensee effectively identified, evaluated and prioritized, and implemented effective corrective actions for conditions adverse to quality. However, the team identified that additional effort is needed in all three areas. The team identified some instances of failure to initiate corrective action documents and numerous examples of failure to appropriately classify deficiencies as conditions adverse to quality. The team determined that quality and documentation for operability assessments has not improved significantly over the course of the evaluation period. Further, on occasion personnel were not self-critical as reflected by poor operational decision making. Two examples of findings reflect the condition of the corrective action problem evaluation activities in the mid portion of the assessment period. The team remained concerned that a lack of understanding of the detailed design and licensing basis continued to be evident in problem resolution. The team concluded that the licensee, generally, implemented timely, effective corrective actions, although some examples indicate continuing weakness in this area.

The team determined that the licensee had increased efforts to evaluate existing industry operating experience for relevance to the facility, and had entered identified items in the corrective action program; however, the team identified some examples that contributed to plant events.

The extensive performance improvement plan developed to address the substantive cross-cutting issue in human performance has addressed daily worker practice issues very well, although recent events occurred that indicate challenges remain. The increased management involvement in the corrective action program and in daily activities assisted in the improved performance. The team determined that licensee audits and assessments became more detailed, probing and self-critical with better assessments at the end of the assessment period. The licensee used benchmarking of industry best practices and third party evaluations that improved the corrective action program during this assessment period. While some of the changes were too recent to evaluate, the team concluded that improvements in the significant root cause process, Corrective Action Review Board graded approach, and scope and timing of corrective actions had improved.

On the basis of formal and informal interviews conducted during this inspection, the team determined that employees will raise issues to their supervision, use the corrective action program, and if necessary, bring concerns to the employee concerns program. The team concluded that the licensee established an acceptable and improving safety-conscious work environment. However, some indication exists that additional effort is needed to encourage the free flow of information to ensure safety issues are resolved promptly.

A. Inspector-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

G. Pick/D. Dumbacher (4660)

PIM NRC NCV BI Green November 30, 2006 71152B
Failure to initiate Callaway Action Request

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for failure to initiate Callaway Action Requests for conditions adverse to quality that affected the reliability of mitigating systems. Specifically, on August 17, 2005, and on May 30, 2006, the licensee discovered a high point air trap in the Train A safety injection discharge piping and decreasing water level in Steam Generators A and D; however, the licensee failed to enter these conditions adverse to quality into their corrective action program. The water in the main steam line contributed to a water hammer and the void had the potential to impact operability of the safety injection system. The licensee entered this deficiency into their corrective action program as Callaway Action Request 200609812.

The performance deficiency involved the failure to initiate corrective action documents for identified conditions adverse to quality, as required. This finding is more than minor because it is associated with the equipment performance attribute of the mitigating systems cornerstone and affects the associated cornerstone objective to ensure the reliability and availability of systems that respond to initiating events. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone, was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. The finding has cross-cutting aspects related to problem identification and resolution, in that, personnel did not identify issues at a low threshold and in a timely manner commensurate with their safety significance (Section 4OA2.e(2)(a)).

D. Dumbacher/H. Abuseini (4660)

PIM NRC NCV BI Green November 30, 2006 71152B
Failure to identify conditions adverse to quality

The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, and the corrective action program because licensee personnel failed to recognize and to identify two separate examples as conditions adverse to quality. Specifically, on April 13, 2006, and on October 17, 2006, licensee personnel did not identify blocked containment cooler tubes and a dirty emergency diesel generator turbocharger air intake filter, respectively, as conditions adverse to quality. Failure to recognize these conditions as degraded and identify them as conditions adverse to quality, delayed the immediate evaluation of operability and implementation of corrective actions. The licensee entered this deficiency into their corrective action program as Callaway Action Request 200609813.

The performance deficiency involved the failure to promptly identify and correct conditions adverse to quality. The inappropriate classification of Callaway Action Requests 200602989 and 200608806 as Action Notice Callaway Action Requests delayed and prevented actions required by the corrective action program. This finding is greater than minor because a later evaluation by the licensee determining that safety related equipment had been adversely affected.

This deficiency is similar to Manual Chapter 0612, Appendix E, Example 4.a. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. The finding has cross-cutting aspects related to problem identification and resolution, in that, personnel did not identify issues at a low threshold and in a timely manner commensurate with their safety significance (Section 4OA2.e(2)(b)).

M. Peck (4660)

PIM NRC NCV BI Green November 30, 2006 71152B
Inadequate operability determination of a degraded main steam isolation valve

The team identified a noncited violation of Technical Specification 3.7.2, after operations personnel failed to enter and implement required Technical Specification 3.7.2 actions. Specifically, the licensee had performed an inadequate operability determination related to a degraded main steam isolation valve that resulted in exceeding the allowed Technical Specifications out-of-service time between December 29 and 31, 2004. On October 19, 2006, the NRC determined that the licensee should have declared the main steam isolation valve and its actuation channel inoperable after removing one of two hydraulic actuators from service. The licensee entered this deficiency into their corrective action program as Callaway Action Request 200609233.

The performance deficiency involved the failure to perform an adequate operability evaluation of degraded plant equipment. As a result, the licensee failed to comply with the Technical Specifications. This finding is greater than minor because the configuration control attribute of the barrier integrity cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radio nuclide releases caused by accidents or events is affected. The team used the "At Power Significance Determination Process," of Manual Chapter 0609. The team concluded that a Phase 2 analysis was required because this finding affects both the fuel and containment barriers.

The team performed a Phase 2 analysis using the "Risk-Informed Inspection Notebook for Callaway Nuclear Generating Station Unit 1," Revision 2. The team assumed that (1) one of two actuator trains was unavailable on one main steam isolation valve for less than 3 days and (2) the degraded actuator did not reduce the remaining main steam isolation valve mitigation capability credit to less than full mitigation credit. Based on the results of the Phase 2 analysis, this finding is determined to have very low safety significance. This finding has a cross-cutting aspect in the area of problem identification and resolution because the licensee did not thoroughly and correctly evaluate the operability of the degraded main steam isolation valve (Section 4OA2.e(2)(c).

G. Pick (4660)

PIM Self NCV BI Green November 30, 2006 71152B
Failure to effectively implement actions to prevent recurrence

A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, resulted from the failure to correct, and preclude repetition of (evaluate extent of condition), a significant condition adverse to quality related to identification of high spots in horizontal safety Injection system discharge piping. Specifically, the licensee failed to identify all high spots in the susceptible discharge piping in February 2005; consequently, a modification did not prevent recurrence of voids collecting in high spots. The licensee entered the deficiency into their corrective action program as Callaway Action Request 200608644.

The performance deficiency involved the failure to effectively evaluate all susceptible points in the Train A safety injection discharge piping. This finding is more than minor because it is associated with the equipment performance attribute of the mitigating systems cornerstone and affects the cornerstone objective of ensuring the availability of systems that respond to initiating events. The failure of the design change affected the reliability of the safety injection system. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. This finding has a cross-cutting aspect related to problem identification and resolution, in that, the licensee did not thoroughly evaluate the voiding problems such that the resolutions addressed the extent of condition (Section 4OA2.e(2)(d)).

D. Dumbacher (4660)

PIM Self NCV BI Green November 30, 2006 71152B
Failure to promptly correct a condition adverse to quality

A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI resulted after operations personnel failed to implement corrective actions. Specifically, the licensee failed to modify Procedure OSP-AL-V0003, "Auxiliary Feedwater Pump Discharge Check Valve (ALV0054) Closure Test," to ensure that upstream piping would be vented prior to performing the test to prevent overpressurizing the turbine-driven auxiliary feedwater pump suction pipe. The licensee entered this deficiency into their corrective action program as Callaway Action Request 200509277.

The performance deficiency involved the failure to change a procedure as recommended in a corrective action to prevent recurrence. This finding associated with failure to implement corrective action is greater than minor because, if left uncorrected, the finding would become a more significant safety concern. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because it only affected the mitigating systems cornerstone and was not a design or qualification deficiency, did not represent a loss of a safety function, and did not affect seismic, flooding or severe weather initiating events. This finding has a crosscutting aspect in the area of human performance associated with resources because the licensee did not ensure complete, accurate, up-to-date procedures were available to plant operators (Section 4OA2.e(2)(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.