



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
ARLINGTON, TEXAS 76011-4125

July 18, 2011

Mr. Adam C. Heflin, Senior Vice  
President and Chief Nuclear Officer  
Union Electric Company  
P.O. Box 620  
Fulton, MO 65251

Subject: CALLAWAY - NRC INTEGRATED INSPECTION REPORT  
NUMBER 05000483/2011003

Dear Mr. Heflin:

On June 23, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Callaway Plant. The enclosed integrated inspection report documents the inspection findings, which were discussed on June 22, 2011, with Mr. C. Reasoner, Vice President Engineering, and other members of your staff.

The inspections examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the NRC identified one Severity Level IV violation of NRC requirements. This violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at (<http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>). The NRC also identified five findings that were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC determined that violations are associated with these issues. Additionally, two licensee-identified violations, which were determined to be of very low safety significance, are listed in this report. However, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating these violations as noncited violations, consistent with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the violations or the significance of the noncited 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, 612 E. Lamar Blvd, Suite 400, Arlington, Texas, 76011-4125; 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 addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide

Union Electric Company

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a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region IV, and the NRC Resident Inspector at the Callaway Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

Sincerely,

/RA/

Geoffrey B. Miller, Chief  
Project Branch B  
Division of Reactor Projects

Docket: 50-483  
License: NPF-30

Enclosure:  
NRC Inspection Report 05000483/2011003  
w/Attachment: Supplemental Information

cc w/Enclosure:

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000483

License: NPF-30

Report: 05000483/2011003

Licensee: Union Electric Company

Facility: Callaway Plant

Location: Junction Highway CC and Highway O

Dates: March 25 through June 23, 2011

Inspectors: D. Dumbacher, Senior Resident Inspector  
J. Groom, Resident Inspector  
C. Alldredge, Health Physicist  
P. Elkmann, Senior Emergency Preparedness Inspector  
C. Graves, Health Physicist  
G. Guerra, Emergency Preparedness Inspector  
R. Latta, Senior Reactor Inspector  
L. Ricketson, P.E., Senior Health Physicist

Approved By: G. Miller, Chief, Project Branch B  
Division of Reactor Projects

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## SUMMARY OF FINDINGS

IR 05000483/2011003; 03/25/2011 – 06/23/2011; Callaway Plant, Integrated Resident and Regional Report; Flood Protection Measures, Operability Evaluations, Surveillance Testing, Radioactive Solid Waste Processing, Radioactive Material Handling, Storage, and Transportation, and Event Follow-up.

The report covered a 3-month period of inspection by resident inspectors and an announced baseline inspections by region-based inspectors. Five Green noncited violations and one Severity Level IV violation of significance were identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 0609, "Significance Determination Process." The cross-cutting aspect is determined using Inspection Manual Chapter 0310, "Components Within the Cross-Cutting Areas." Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

### A. NRC-Identified Findings and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. A self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," was identified when the licensee's failure to correctly follow a test procedure resulted in a negative reactivity excursion due to excessive boration. On May 27, 2011, with the Callaway Plant at 100 percent power, maintenance was in progress to perform a functional test of the plant's safety system trip actuating devices. During the test the instrument maintenance technicians failed to place the mode selector switch in the "test" position. This resulted in switching the charging pump suction from the volume control tank to the refueling water storage tank. The inadvertent actuation resulted in a reactivity excursion that required lowering main turbine power and reactor power to about 92 percent. The crew stabilized the plant and returned critical parameters to their normal control bands. The licensee entered this issue in the corrective action program as Callaway Action Request 201104451.

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This finding is more than minor because it was associated with the configuration control attribute of the Initiating Events Cornerstone and affected the associated cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operations. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding was determined to be of very low safety significance since it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigating equipment or functions will not be available. This finding had a cross-cutting aspect in the area of human performance associated with the work practices component because the instrument maintenance technicians failed to adequately use human error prevention techniques, such as self- and peer-

checking to ensure that work activities are performed safely [H.4(a)](Section 4OA3).

Cornerstone: Mitigating Systems

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," after the licensee failed to provide adequate design control measures for verifying the adequacy of the flooding analysis associated with the 2009 modification that replaced essential service water carbon steel piping with high density polyethylene piping. The licensee did not update the flooding analysis of record to consider potential failures in the new piping. The licensee generated Callaway Action Request 201102957 to develop a means to evaluate the relative stresses associated with the new pipe.

This finding was determined to be greater than minor because it impacted the Mitigating Systems Cornerstone attribute of design control and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding required a Phase 2 significance determination. Using the presolved worksheet from the "Risk Informed Inspection Notebook for the Callaway Station," Revision 2.01a, the finding was red, which warranted further review. Therefore, a senior reactor analyst performed a bounding Phase 3 significance determination. The bounding change to the core damage frequency was approximately  $4.1E-7$  (Green). This was impacted significantly by the very small amount of new piping in the room. This finding was determined to have a cross-cutting aspect in the area of Problem Identification and Resolution associated with the corrective action component in that the licensee did not thoroughly evaluate the extent of condition when the residents challenged the flooding calculation in December 2010 such that the resolutions addressed causes and extent of conditions, as necessary [P.1(c)](Section 1R06).

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to adequately evaluate a potential high-energy line break in nonseismically qualified auxiliary steam piping in the refueling water storage tank valve house. The harsh environment from a high-energy line break had the potential to impact safety related level transmitters associated with the refueling water storage tank. Following identification of this issue by the inspectors, the licensee analyzed the nonnuclear auxiliary piping to ensure it could withstand safe shutdown earthquake loadings which allowed high-energy line breaks at intermediate locations to be excluded. This issue was entered into the licensee's corrective action program as Callaway Action Request 201102588.

This finding is greater than minor because it is associated with the Mitigating Systems Cornerstone attribute of design control and affects the associated cornerstone objective to ensure the availability, reliability, and capability of

systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding is determined to be of very low safety significance since subsequent evaluation concluded the issue was a design or qualification deficiency confirmed not to result in loss of operability or functionality. This finding did not have a cross-cutting aspect since the error associated with the high-energy line break analysis was not reflective of current licensee performance (Section 1R15).

Cornerstone: Barrier Integrity

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for failure to adequately demonstrate that the seat leakage of centrifugal charging pump and safety injection pump suction isolation valves remained within acceptable limits. These valves have a combined allowable leakage rate of three gallons per minute to ensure that offsite thyroid and whole body doses remain within regulatory limits. Since the flowpaths have isolation valves for which seat leakage is limited to a specific maximum amount, the inspectors identified that they should be considered Category A valves as specified in ASME OM Code which requires the valves be tested at least once every two years. At the end of the inspection period, the licensee was planning a recurring surveillance test to verify seat leakage for these valves is within acceptable limits. This issue was entered into the licensee's corrective action program as Callaway Action Request 201104577.

This finding was greater than minor because it was associated with the Barrier Integrity Cornerstone attribute of configuration control and affects the associated cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the issue was determined to represent an actual open pathway in the physical integrity of reactor containment. Using Manual Chapter 0609, Appendix H, "Containment Integrity Significance Determination Process," this finding was determined to be a Type B finding since it was related to a degraded condition that has potentially important implications for the integrity of containment, without affecting the likelihood of core damage. This finding was found to be of very low safety significance since the nontested flowpath would be comparable to small lines (less than 1-2 inches in diameter) and would not generally contribute to large early release frequency. This finding did not have a cross-cutting aspect since the error associated with the inservice testing program was not reflective of current licensee performance (Section 1R22).

Cornerstone: Public Radiation Safety

- Green. The inspectors identified a noncited violation of 10 CFR 70.42 (c) for failure to verify that a recipient of special nuclear material was authorized to

receive the quantity of material shipped. This finding was determined to be of very low safety significance. Specifically, On June 15, 2010, the licensee shipped laundry contaminated with radioactive material to a state licensed processing facility in Alabama. The licensee verified that the processing facility was licensed to handle the material being shipped, but failed to verify that the recipient's license authorized the quantity of material shipped. The licensee notified the Alabama licensee and proposed a revision to the shipping procedures. This violation was entered into the licensee's corrective action program as Callaway Action Request 201104385.

This finding was greater than minor because it was associated with the Public Radiation Safety Cornerstone attribute of program and process (transportation program), and affected the cornerstone objective, in that, license conditions were violated and these conditions are in place, in part, to control exposure to radiation. Using the public radiation safety significance determination process, the inspectors determined the finding had very low safety significance because (1) radiation limits were not exceeded, (2) there was no breach of a package during transit, (3) it did not involve a certificate of compliance issue, (4) it was not a low level burial ground nonconformance, and (5) it did not involve a failure to make notifications or provide emergency information. This finding had a crosscutting aspect in the area of human performance, resources component, because licensee procedures were inadequate to ensure proper shipping of radioactive material and that license conditions were not violated [H.2(c)](Section 2RS08).

- Severity Level IV. The inspectors identified a noncited violation of 10 CFR 50.71 "Maintenance of Records," because the licensee failed to update their Final Safety Analysis Report with submittals that include the effects of a change made to the facility. Specifically, the licensee built the old steam generator storage facility on the owner controlled area for long-term radwaste storage of four decommissioned steam generators and failed to update the Final Safety Analysis Report to include these changes to the facility. This issue was entered in the licensee's corrective action program as Callaway Action Request 201104434.

This issue was dispositioned using traditional enforcement because it had the potential for impacting the NRC's ability to perform its regulatory function. The finding is more than minor because it has a material impact on licensed activities in that the four decommissioned steam generators, with a significant radioactive source term, have been relocated from the plant radiological controlled area to the owner controlled area. In addition, the radwaste management program has been affected because the licensee determined that this low-level radwaste facility will store these large components until an appropriate facility for disposal can be determined. The finding is characterized as a Severity Level IV noncited violation in accordance with NRC Enforcement Policy, Section 6.1, and was treated as a noncited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy (Section 2RS08).

**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 are listed in Section 4OA7.

## REPORT DETAILS

### Summary of Plant Status

The Callaway Plant began the inspection period at near 100 percent power. On May 27, 2011, the licensee performed a power reduction to approximately 92 percent power in response to an inadvertent boration event when the refueling water storage tank was aligned to the running charging pump due to a procedural error. The plant was returned to near 100 percent power that day. Callaway operated at near 100 percent power for the remainder of the inspection period.

### 1. REACTOR SAFETY

#### Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

#### 1R01 Adverse Weather Protection (71111.01)

##### .1 Summer Readiness for Offsite and Alternate-ac Power

##### a. Inspection Scope

The inspectors performed a review of preparations for summer weather for the switchyard system, including conditions that could lead to loss-of-offsite power and conditions that could result from high temperatures. The inspectors reviewed the procedures affecting these areas and the communications protocols between the transmission system operator and the plant to verify that the appropriate information was being exchanged when issues arose that could affect the offsite power system. Examples of aspects considered in the inspectors' review included:

- Coordination between the transmission system operator and the plant's operations personnel during off-normal or emergency events
  - Explanations for the events
  - Notifications from the transmission system operator to the plant when the offsite power system was returned to normal
- 
- Operating experience related to solar flares, historical Callaway transformer faults, and transformer gas detectors

During the inspection, the inspectors focused on plant-specific design features and the procedures used by plant personnel to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the Final Safety Analysis Report and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant-specific procedures. The inspectors also reviewed corrective action program items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their

corrective action program in accordance with station corrective action procedures. Specific documents reviewed during this inspection are listed in the attachment. The inspectors' reviews focused specifically on the following plant systems:

- The main transformer and the safeguards transformer were reviewed for issues related to the oil systems, fans, and corrective actions for the safeguards transformer fault in 2010

These activities constitute completion of one readiness for summer weather affect on offsite and alternate-ac power sample as defined in Inspection Procedure 71111.01-05.

b. Findings

No findings were identified.

.2 Readiness to Cope with External Flooding

a. Inspection Scope

On April 11, 2011, the inspectors evaluated the design, material condition, and procedures for coping with the design basis probable maximum flood. The evaluation included a review to check for deviations from the descriptions provided in the Final Safety Analysis Report for features intended to mitigate the potential for flooding from external factors. As part of this evaluation, the inspectors checked for obstructions that could prevent draining, checked that the roofs did not contain obvious loose items that could clog drains in the event of heavy precipitation, and determined that barriers required to mitigate a flood were in place and operable. Additionally, the inspectors performed an inspection of the protected area to identify any modification to the site that would inhibit site drainage during a probable maximum precipitation event or allow water ingress past a barrier. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one external flooding sample as defined in Inspection Procedure 71111.01-05.

b. Findings

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No findings were identified.

**1R04 Equipment Alignments (71111.04)**

.1 Partial Walkdown

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- April 14, 2011, Condensate storage tank and associated system piping
- May 12, 2011, Hydrogen recombiner system
- June 2, 2011, The technical specification required boration flowpath portions of the chemical volume control system when the boric acid transfer system was unavailable due to maintenance
- June 8, 2011, Steam generator blowdown system

The inspectors selected these systems based on their risk significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could affect the function of the system, and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, Final Safety Analysis Report, technical specification requirements, administrative technical specifications, outstanding work orders, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also inspected accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of four partial system walkdown samples as defined in Inspection Procedure 71111.04-05.

b. Findings

No findings were identified.

.2 Complete Walkdown

a. Inspection Scope

On May 15, 2011, the inspectors performed a complete system alignment inspection of the control room ventilation system to verify the functional capability of the system. The inspectors selected this system because it was considered both safety significant and risk significant in the licensee's probabilistic risk assessment. The inspectors inspected the system to review mechanical and electrical equipment line ups, electrical power availability, system pressure and temperature indications, as appropriate, component labeling, component lubrication, component and equipment cooling, hangers and supports, operability of support systems, and to ensure that ancillary equipment or debris did not interfere with equipment operation. The inspectors reviewed a sample of

past and outstanding work orders to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the corrective action program database to ensure that system equipment-alignment problems were being identified and appropriately resolved. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one complete system walkdown sample as defined in Inspection Procedure 71111.04-05.

b. Findings

No findings were identified.

**1R05 Fire Protection (71111.05)**

Quarterly Fire Inspection Tours

a. Inspection Scope

The inspectors conducted fire protection walkdowns that were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- April 1, 2011, Auxiliary building 1974' elevation general area
- April 15, 2011, Class 1E 4.16 kV switchgear rooms
- May 12, 2011, Containment building
- May 20, 2011, Auxiliary building 2026' elevation general area
- June 17, 2011, Turbine-driven auxiliary feedwater pump room

The inspectors reviewed areas to assess if licensee personnel had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant; effectively maintained fire detection and suppression capability; maintained passive fire protection features in good material condition; and had implemented adequate compensatory measures for out of service, degraded or inoperable fire protection equipment, systems, or features, in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to affect equipment that could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the attachment, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to

be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's corrective action program.

These activities constitute completion of five quarterly fire-protection inspection samples as defined in Inspection Procedure 71111.05-05.

b. Findings

No findings were identified.

**1R06 Flood Protection Measures (71111.06)**

a. Inspection Scope

The inspectors reviewed the Final Safety Analysis Report, the flooding analysis, and plant procedures to assess susceptibilities involving internal flooding; reviewed the corrective action program to determine if licensee personnel identified and corrected flooding problems; inspected underground bunkers/manholes to verify the adequacy of sump pumps, level alarm circuits, cable splices subject to submergence, and drainage for bunkers/manholes; and verified that operator actions for coping with flooding can reasonably achieve the desired outcomes. The inspectors also inspected the areas listed below to verify the adequacy of equipment seals located below the flood line, floor and wall penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, and control circuits, and temporary or removable flood barriers. Specific documents reviewed during this inspection are listed in the attachment.

- April 11, 2011, Train A and B emergency diesel generator rooms 5201 and 5202
- April 19, 2011, Essential service water pipe-chase room 3101
- May 18, 2011, Manhole MH-01N

These activities constitute completion of two flood protection measures inspection samples and one bunker/manhole sample as defined in Inspection Procedure 71111.06-05.

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b. Findings

Introduction. The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," after the licensee failed to provide adequate design control measures for verifying the adequacy of the flooding analysis associated with the 2009 modification that replaced essential service water carbon steel piping with high density polyethylene piping.

Description. On April 19, 2011, the inspectors identified that the Callaway Plant failed to maintain an adequate design control calculation for the flooding analysis of control building room 3101. This risk significant room with respect to flooding had the essential service water piping partially replaced with high density polyethylene piping. The new

pipe has a 4.0 inch wall thickness compared to the 0.5 inch wall thickness of the room's metallic pipe. The modification was completely installed in the spring of 2009. The NRC issued the safety evaluation for the associated License Amendment/Relief Request I3R10 on October 31, 2008. However, the licensee had not requested relief from commitments related to assumptions associated with flood evaluations.

Licensee Calculation XX-49, "Maximum Control Building Flood Level for Room 3101," and NRC Standard Review Plan 3.6.1, "Plant Design for Protection Against Postulated Piping Failures in Fluid Systems Outside Containment," required that a crack size equaling half of the pipe diameter times half of the pipe wall thickness be evaluated with respect to flooding. Final Safety Analysis Report Sections 3.6.2.1.2.4, "Pipe Break Analysis Assumptions," stated that cracks were postulated to occur individually at locations that resulted in the maximum effects from fluid spraying and flooding or environmental conditions. Flooding heights are based on assuming automatic isolation or operator termination of flow to the pipe failure within 30 minutes.

The licensee flood analysis of record did not assume a crack in the newer essential service water piping. Critical room components could be made nonfunctional prior to the 30 minute assumed flow termination time. The Final Safety Analysis Report, Section 3.6.2.1.2.4.c referenced an ASME Code stress formula for metallic piping to exclude postulating a crack and flooding; however, no stress based flood analysis or direct equivalent is discussed for the high density polyethylene piping. The licensee concluded the piping remained operable based on the low stresses in the small sections of high density polyethylene piping in the room. Callaway Action Request 201102957 was generated with action to develop a means to evaluate the high density polyethylene piping in the flooding analysis of record.

Analysis. The performance deficiency associated with this finding was incorrect calculation assumptions in the control building room 3101 flooding analysis of record. This finding was determined to be greater than minor because it impacted the Mitigating Systems Cornerstone attribute of design control and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences.

**Internal Flooding:** The inspectors performed the initial significance determination for the essential service water pipe concern. The inspector used the NRC Inspection Manual 0609, Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings." The finding screened to a Phase 2 significance determination because it involved a potential loss of safety function. The inspectors performed a Phase 2 significance determination and used the pre-solved worksheet from the "Risk Informed Inspection Notebook for the Callaway Station," Revision 2.01a. For a loss of both trains of essential service water, the finding was red, which warranted further review. Therefore, a senior reactor analyst performed a bounding Phase 3 significance determination. The analyst performed the assessment using very conservative assumptions. Four new pipe sections entered into the affected room. Each section was about 18 inches long. However, about 12 inches of each section was encapsulated by housing, leaving approximately 6 inches in each section that could crack and leak a

significant amount of water into the room. Therefore, the analyzed section equaled 24 inches of pipe (4 \* 6 inches). The NRC had no failure data for this particular type of pipe. The pipe was of a polymer material and the wall thickness was approximately 4 inches. The analyst reasoned that the pipe failure data for normal carbon steel pipe, which was normally used in service water piping systems, should bound the hypothetical failure rate for this polymer pipe. The typical wall thickness for service water pipe was much less than 1 inch. NUREG/CR-6928, "Industry-Average Performance for Components and Initiating Events at U.S. Commercial Nuclear Power Plants," dated January, 2007, specified the mean frequency for a small leak in a service water pipe was 6.9E-10/ft-hour. This was the highest failure rate of the various piping groups. Therefore, the estimated annual frequency for a pipe failure was:

Pipe failure frequency = 2 feet \* 6.9E-10/ft-hr \* 8760 hours/year = 1.2E-5/year

If a pipe failure occurred, the valves that are used to isolate the nonsafety service water piping from the safety related service water piping could be flooded and fail. Valves from both trains could be affected. The analyst conservatively assumed that, if a pipe failure occurred, both trains of service water would fail. In addition, the analyst assumed that a plant centered loss of offsite power would occur at the same time. This was very conservative, in that a loss of offsite power would not likely occur. The analyst used the Callaway SPAR model, Revision 8.16, dated May 27, 2009, to calculate the conditional core damage probability for this event. The SPAR model was not modified to include the new auxiliary feedwater pump or the alternate emergency power supply diesel generators. The analyst did not adjust the model to accommodate these components, which was conservative. The analyst set the train A and B essential service water pump basic events to 1.0 (fail) and set the plant centered loss of offsite power basic event to 1.0 (the event would occur). The analyst then solved only the plant centered loss of offsite power sequences. The conditional core damage probability was 3.4E-2. Therefore, the bounding change to the core damage frequency (delta-CDF) was approximately:

Delta-CDF = 3.4E-2 \* 1.2E-5/year = 4.1E-7 (Green)

The dominant core damage sequences included the plant centered loss of offsite power events, failure of both emergency diesel generators and the failure to recover offsite power in 4 hours. Equipment that helped mitigate the risk included the auxiliary feedwater system and the steam generators.

**Large Early Release Frequency:** To evaluate the change to the large early release frequency, the analyst used Inspection Manual Chapter 0609, Appendix H, "Containment Integrity Significance Determination Process." Callaway has a large dry containment. The finding screened as having very low safety significance for large early release frequency because it did not affect the intersystem loss of coolant accident or steam generator tube rupture categories. Because the delta-CDF was less than 1E-6 and the finding was not a significant contributor to the large early release frequency, the finding was of very low safety significance (Green). This finding was determined to have a cross-cutting aspect in the area of Problem Identification and Resolution associated with the corrective action component in that the licensee did not thoroughly evaluate this

issue during the development of the modification package or during a calculation revision in December 2010 such that the resolutions addressed causes and extent of conditions, as necessary [P.1(c)].

Enforcement. Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criteria III, "Design Control," required that the licensee establish measures to assure that applicable regulatory requirements and design bases be correctly translated into specifications and that design control measures be provided for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculation methods. Contrary to the above, prior to October 31, 2008, the licensee did not establish measures to ensure that applicable regulatory requirements and the design basis of the flooding protection analysis was translated into Calculation XX-49, "Maximum Control Building Flood Level for Room 3101," and failed to ensure that the design was correctly verified. Because of the very low safety significance and Callaway's action to place this issue in their corrective action program as Callaway Action Request 201102957, this violation is being treated as a noncited violation consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000483/2011003-01, "Failure to Maintain an Adequate Flooding Analysis for Room 3101."

#### **1R11 Licensed Operator Requalification Program (71111.11)**

##### **a. Inspection Scope**

On June 1, and also on June 7, 2011, the inspectors observed crews of licensed operators in the plant's simulator to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- Licensed operator performance
- Crew's clarity and formality of communications
- Crew's ability to take timely actions in the conservative direction
- Crew's prioritization, interpretation, and verification of annunciator alarms
- Crew's correct use and implementation of abnormal and emergency procedures
- Control board manipulations
- Oversight and direction from supervisors
- Crew's ability to identify and implement appropriate technical specification actions and emergency plan actions and notifications

The inspectors compared the crew's performance in these areas to preestablished operator action expectations and successful critical task completion requirements. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of two quarterly licensed-operator requalification program sample as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

**1R12 Maintenance Effectiveness (71111.12)**

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk significant systems:

- June 3, 2011, Post accident monitoring equipment
- June 16, 2011, Nonsafety auxiliary feedwater pump
- June 17, 2011, Class 1E air conditioning units

The inspectors reviewed events such as where ineffective equipment maintenance has resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- Implementing appropriate work practices
  - Identifying and addressing common cause failures
  - Scoping of systems in accordance with 10 CFR 50.65(b)
  - Characterizing system reliability issues for performance
- 
- Charging unavailability for performance
  - Trending key parameters for condition monitoring
  - Ensuring proper classification in accordance with 10 CFR 50.65(a)(1) or -(a)(2)
  - Verifying appropriate performance criteria for structures, systems, and components classified as having an adequate demonstration of performance through preventive maintenance, as described in 10 CFR 50.65(a)(2), or as requiring the establishment of appropriate and adequate goals and corrective

actions for systems classified as not having adequate performance, as described in 10 CFR 50.65(a)(1)

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the corrective action program with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of three quarterly maintenance effectiveness samples as defined in Inspection Procedure 71111.12-05.

b. Findings

No findings were identified.

**1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)**

a. Inspection Scope

The inspectors reviewed licensee personnel's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- April 13, 2011, Planned essential service water/emergency diesel generator outage
- May 2, 2011, Planned turbine-driven auxiliary feedwater pump and nonsafety auxiliary feedwater pump work window
- May 9, 2011, Review of recent unplanned work activities to determine the possible impact of a nonconservative software process problem identified in Callaway Action Request 201103736

The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that licensee personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When licensee personnel performed emergent work, the inspectors verified that the licensee personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of three maintenance risk assessments and emergent work control inspection samples as defined in Inspection Procedure 71111.13-05.

b. Findings

No findings were identified.

**1R15 Operability Evaluations (71111.15)**

a. Inspection Scope

The inspectors reviewed the following issues:

- March 30, 2011, Callaway Action Request 201102329, evaluation of high-energy line break sources in room 1206/1207
- April 4, 2011, Callaway Action Requests 201102588 and 201102619, potential high-energy line break and harsh environment on refueling water storage tank level transmitters
- April 5, 2011, Callaway Action Request 201102729, emergency diesel generator jacket water expansion tank below top of engine
- April 11 and 13, 2011, Callaway Action Request 201102957, high density polyethylene pipe in room 3101 prompt operability determination
- May 19, 2011, Callaway Action Request 201104266, discovery of void in safety injection system train A

The inspectors selected these potential operability issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and Final Safety Analysis Report to the licensee personnel's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors also reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of five operability evaluations inspection samples as defined in Inspection Procedure 71111.15-04.

b. Findings

Introduction. The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to ensure the suitability of the refueling water storage tank level transmitters to function following a potential high-energy line break.

Description. On March 30, 2011, the resident inspectors discovered that sections of the auxiliary steam lines used for refueling water storage tank heating have design ratings such that they should be classified as high-energy lines. The Callaway Final Safety Analysis Report incorporates NRC Branch Technical Position MEB 3-1 as the basis for the selection of high-energy pipe breaks. High-energy piping includes those systems or portions of systems in which the maximum operating temperature exceeds 200°F or the maximum operating pressure exceeds 275 psig during normal plant conditions. For nonnuclear piping such as auxiliary steam piping, breaks are postulated to occur at terminal ends of piping runs and at all intermediate fittings including elbows, tees, reducers, welded attachments, and valves. Based on the criteria in NRC Branch Technical Position MEB 3-1, the inspectors concluded that the Callaway licensing basis required postulation of a high-energy line break within the refueling water storage tank valve house. The inspectors identified that a high-energy line break in this room had not been previously evaluated and that refueling water storage level transmitters BNLT0930, BNLT0931, BNLT0932, and BNLT0933, were not qualified for a potentially harsh environment.

The licensee initiated Callaway Action Request 201102588 to document the concern about a potential high-energy line break from the auxiliary steam system impacting the refueling water storage tank level instrumentation. The licensee's nuclear oversight department reviewed the immediate operability determination and found that it failed to adequately address all of the design requirements specified in the Callaway Final Safety Analysis Report. Specifically, Callaway's Final Safety Analysis Report, Section 3.1.2.f, specifies that no credit is taken for the functioning of nonseismic components during a loss of coolant accident. Based on this information, the licensee concluded that a passive failure of the auxiliary steam line within the refueling water storage tank valve house should be postulated concurrent with a loss of coolant accident. The resident inspectors also noted that the licensee failed to evaluate all of the required functions of the refueling water storage tank level transmitters. Specifically, Final Safety Analysis Report, Section 7.4.1.b, identifies the refueling water storage tank level instruments as required indicators to maintain safe shutdown at hot standby conditions. The ability to maintain safe shutdown is required following a postulated high-energy line break.

Since the refueling water storage tank level instruments were not qualified for a harsh environment, the licensee concluded that the level transmitters would not be able to perform their specified safety function. Since there is no technical specification action for more than one transmitter inoperable, the licensee entered Technical Specification Limiting Condition for Operation 3.0.3 on March 31, 2011. The auxiliary steam system was secured on the afternoon of March 31, 2011, which allowed the licensee to exit Limiting Condition for Operation 3.0.3.

Additional corrective actions were taken by the licensee to analyze the nonnuclear auxiliary piping to ensure it could withstand safe shutdown earthquake loadings. This analysis allowed selection of high-energy line breaks consistent with the requirements used for ASME Section III, Class 2 and 3 piping which excluded breaks at intermediate locations. The corrective actions to analyze the piping to safe shutdown earthquake loadings permitted restoration of the auxiliary steam system.

Analysis. The performance deficiency associated with this finding involved the licensee's failure to adequately evaluate a potential high-energy line break in the refueling water storage tank valve house. This finding is greater than minor because it is associated with the Mitigating Systems Cornerstone attribute of design control and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding is determined to be of very low safety significance since subsequent evaluation concluded the issue was a design or qualification deficiency confirmed not to result in loss of operability or functionality. This finding did not have a cross-cutting aspect since the error associated with the high-energy line break analysis was not reflective of current licensee performance.

Enforcement. Title 10 of the Code of Federal Regulations Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of structures, systems and components. Contrary to the above, prior to March 31, 2011, the licensee failed to establish the suitability of equipment located in the refueling water storage tank valve house to function following a potential high energy line break in nonnuclear, nonseismically analyzed auxiliary steam piping. The harsh environment from a high-energy line break had the potential to impact safety related level transmitters associated with the refueling water storage tank. Because this violation is of very low safety significance and has been entered into the licensee's corrective action program as Callaway Action Request 201102588, this violation is being treated as a noncited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000483/2011003-02, "Failure to Analyze Refueling Water Storage Tank Level Transmitters for High-Energy Line Break."

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## **1R18 Plant Modifications (71111.18)**

### **.1 Temporary Modifications**

#### **a. Inspection Scope**

To verify that the safety functions of important safety systems were not degraded, the inspectors reviewed the temporary modification identified as TM 10511213, jumpers associated with testing of control room habitability design.

The inspectors reviewed the temporary modification and the associated safety-evaluation screening against the system design bases documentation, including the

Final Safety Analysis Report and the technical specifications, and verified that the modification did not adversely affect the system operability/availability. The inspectors also verified that the installation and restoration were consistent with the modification documents and that configuration control was adequate. Additionally, the inspectors verified that the temporary modification was identified on control room drawings, appropriate tags were placed on the affected equipment, and licensee personnel evaluated the combined effects on mitigating systems and the integrity of radiological barriers.

These activities constitute completion of one sample for temporary plant modifications as defined in Inspection Procedure 71111.18-05.

b. Findings

No findings were identified.

.2 Permanent Modifications

a. Inspection Scope

The inspectors reviewed key affected parameters associated with energy needs, materials, replacement components, timing, heat removal, control signals, equipment protection from hazards, operations, flow paths, pressure boundary, ventilation boundary, structural, process medium properties, licensing basis, and failure modes for the permanent modifications listed below.

- April 27, 2011, Alternate emergency power system
- June 2, 2011, Component cooling water system radwaste return line check valve installation

The inspectors verified that modification preparation, staging, and implementation did not impair emergency/abnormal operating procedure actions, key safety functions, or operator response to loss of key safety functions; postmodification testing will maintain the plant in a safe configuration during testing by verifying that unintended system interactions will not occur; systems, structures and components' performance characteristics still meet the design basis; the modification design assumptions were appropriate; the modification test acceptance criteria will be met; and licensee personnel identified and implemented appropriate corrective actions associated with permanent plant modifications. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of two samples for permanent plant modifications as defined in Inspection Procedure 71111.18-05.

b. Findings

No findings were identified.

## 1R19 Postmaintenance Testing (71111.19)

### a. Inspection Scope

The inspectors reviewed the following postmaintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- April 2, 2011, Postmaintenance test of switchyard Breaker 52-1, Job 08503432
- April 4, 2011, Postmaintenance test of fuel building air supply unit
- April 14, 2011, Postmaintenance test of emergency diesel generator train B lube oil system after draining, Job 8506926
- April 14, 2011, Postmaintenance test of chemical and volume control system containment isolation valve
- June 2, 2011, Postmaintenance test of the train B motor-driven auxiliary feedwater pump, Job 11001489
- June 20, 2011, Postmaintenance test of steam generator blow down isolation valve BMHV0001

The inspectors selected these activities based upon the structure, system, or component's ability to affect risk. The inspectors evaluated these activities for the following:

- The effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed
- Acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate

The inspectors evaluated the activities against the technical specifications, the Final Safety Analysis Report, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with postmaintenance tests to determine whether the licensee was identifying problems and entering them in the corrective action program and that the problems were being corrected commensurate with their importance to safety. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of six postmaintenance testing inspection samples as defined in Inspection Procedure 71111.19-05.

b. Findings

No findings were identified.

**1R22 Surveillance Testing (71111.22)**

a. Inspection Scope

The inspectors reviewed the Final Safety Analysis Report, procedure requirements, and technical specifications to ensure that the surveillance activities listed below demonstrated that the systems, structures, and/or components tested were capable of performing their intended safety functions. The inspectors either witnessed or reviewed test data to verify that the significant surveillance test attributes were adequate to address the following:

- Preconditioning
  - Evaluation of testing impact on the plant
  - Acceptance criteria
  - Test equipment
  - Procedures
  - Jumper/lifted lead controls
  - Test data
  - Testing frequency and method demonstrated technical specification operability
  - Test equipment removal
  - Restoration of plant systems
  - Fulfillment of ASME Code requirements
- 
- Updating of performance indicator data
  - Engineering evaluations, root causes, and bases for returning tested systems, structures, and components not meeting the test acceptance criteria were correct
  - Reference setting data
  - Annunciator and alarm setpoints

The inspectors also verified that licensee personnel identified and implemented any needed corrective actions associated with the surveillance testing.

- May 2, 2011, Inservice test of the turbine-driven auxiliary feedwater pump, Job 11501633
- May 2, 2011, Inservice test of the electric and both diesel-driven fire water pumps, Job 10510165
- May 5, 2011, Routine surveillance of leakage from emergency core cooling system recirculation flow paths outside the primary containment
- May 16, 2011, Test of containment isolation valve SJHV0128, pressurizer and reactor coolant sample line containment isolation valve, Job 11001481
- May 27, 2011, Routine instrument maintenance surveillance associated with the trip actuating device testing per Procedure ISF-SB-00A29
- June 8, 2011, Routine surveillance of engineering new fuel inspection per Procedure ETP-ZZ-00003
- June 9, 2011, Routine surveillance for power range heat balance

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of four routine, two inservice test, and one containment isolation valve surveillance testing inspection samples as defined in Inspection Procedure 71111.22-05.

b. Findings

Introduction. The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for the failure to adequately demonstrate that the seat leakage of valves associated with the emergency core cooling system recirculation flow path remained within acceptable limits.

Description. On May 5, 2011, the inspectors reviewed the licensee's program to comply with Technical Specification 5.5.2, "Primary Coolant Sources Outside Containment." This program provides controls to minimize leakage from those systems outside containment that contain highly radioactive fluids during a serious transient or accident to levels as low as practicable. The inspectors also reviewed the licensee's inservice testing program with respect to isolation valves within the recirculation flowpath that provide a barrier to prevent the escape of sump fluids back to the refueling water storage tank consistent with the guidance provided in NRC Information Notice 91-56, "Potential Radioactive Leakage to Tank Vented to Atmosphere." In their review, the inspectors discovered that the licensee had previously evaluated NRC Information Notice 91-56 and identified several potential leakage pathways back to the refueling water storage tank. The licensee concluded that leakage would be limited to three gallons per minute

by assuming that two-valve isolation would result in zero leakage and single valve isolation would result in leakage based on valve size. The inspectors found that testing was only performed on three of the sixteen flowpaths identified by the licensee. The combined allowable leakage rate of three gallons per minute is used as an input assumption to Calculation ZZ-459, "Post LOCA Offsite Thyroid and Whole Body Doses from the RWST and ECCS Pathways."

On May 17, and again on May 31, 2011, the resident inspectors identified to the licensee that seat leakage testing was only performed on a limited number of the flowpaths that could provide a pathway of recirculation sump fluids back to the refueling water storage tank. Specifically, the inspectors identified that the four flowpaths associated with the centrifugal charging pump and safety injection pump suction have isolation valves that should be considered Category A valves as specified in ASME OM Code-2001 with 2003 Addendum, "Code for Operation and Maintenance of Nuclear Power Plants." Section ISTC-1300, "Valve Categories," defines Category A valves as those for which seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their required function. Section ISTC-3600, "Leak Testing Requirements," stipulates that Category A valves with a leakage requirement be tested to verify their seat leakages within acceptable limits at least once every two years. Since the combined seat leakage limit of the isolation valves associated with the centrifugal charging pump and safety injection pump suction is required to be limited to three gallons per minute to preserve the input assumption for Calculation ZZ-459, the inspectors concluded that the isolation valves did have seat leakage criteria in the closed position for fulfillment of their required function. Consequently, the inspectors concluded that the valves should be tested per the requirements of ISTC-3600. The licensee subsequently initiated Callaway Action Request 201104577 to evaluate if a required surveillance test had been missed.

On June 2, 2011, the licensee entered Technical Specification Surveillance Requirement 3.0.3 for a missed surveillance on testing the seat leakages associated with the centrifugal charging pump and safety injection pump suction isolation valves. Entry into Surveillance Requirement 3.0.3 allows the licensee to delay performing the missed surveillance for up to 24 hours or up to the limit of the specified frequency, whichever is greater. The licensee performed a risk evaluation, as required by the surveillance requirement, which allowed delay of the surveillance until the licensee's next scheduled refueling outage. Long term corrective actions by the licensee include reclassification of the centrifugal charging pump and safety injection pump suction isolation valves as Category A valves and implementing a recurring surveillance requirement to verify seat leakage within acceptable limits.

Analysis. The performance deficiency associated with this finding involved the licensee's failure to adequately test centrifugal charging pump and safety injection pump suction isolation valves. This finding is greater than minor because it was associated with the Barrier Integrity Cornerstone attribute of configuration control and affects the cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the issue was determined to

represent an actual open pathway in the physical integrity of reactor containment. Using Manual Chapter 0609, Appendix H, "Containment Integrity Significance Determination Process," this finding was determined to be a Type B finding since it was related to a degraded condition that has potentially important implications for the integrity of the containment, without affecting the likelihood of core damage. This finding was found to be of very low safety significance since the nontested flowpaths would be comparable to small lines (less than 1-2 inches in diameter) and would not generally contribute to large early release frequency. This finding did not have a cross-cutting aspect since the error associated with the inservice testing program was not reflective of current licensee performance.

Enforcement. Title 10 of the Code of Federal Regulations Part 50, Appendix B, Criterion XI, "Test Control," requires, in part, that a test program be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Contrary to the above, prior to June 2, 2011, the licensee failed to establish a suitable test program for centrifugal charging pump and safety injection pump suction isolation valves. Specifically, the licensee failed to adequately verify seat leakage for these valves is within acceptable limits specified in design Calculation ZZ-459, "Post LOCA Offsite Thyroid and Whole Body Doses from the RWST and ECCS Pathways," or the requirements of the ASME OM Code-2001 with 2003 Addendum, "Code for Operation and Maintenance of Nuclear Power Plants." Because this violation is of very low safety significance and has been entered into the licensee's corrective action program as Callaway Action Request 201104577, this violation is being treated as a noncited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000483/2011003-03, "Failure to Adequately Establish Test Program for Isolation Valves in Post-LOCA Recirculation Flowpath."

## **Cornerstone: Emergency Preparedness**

### **1EP1 Exercise Evaluation (71114.01)**

#### **a. Inspection Scope**

The inspectors reviewed the objectives and scenario for the 2011 biennial emergency plan exercise to determine if the exercise acceptably tested major elements of the licensee's emergency plan. The scenario simulated a reactor coolant system leak inside containment escalating to a rupture (loss of coolant system barrier), a turbine failure and trip, failure of the automatic reactor protection system with successful manual trip, core damage and loss of the fuel barrier because of loose material within the reactor vessel, and a monitored radiological release to the environment via a containment penetration failure into the auxiliary building, to demonstrate the licensee personnel's capability to implement their emergency plan. The licensee also demonstrated the ability to appropriately change protective action recommendations for the public based on changes to radiological assessments.

The inspectors evaluated exercise performance by focusing on the risk-significant activities of event classification, offsite notification, recognition of offsite dose consequences, and development of protective action recommendations, in the control room simulator and the following dedicated emergency response facilities:

- Technical Support Center
- Operations Support Center
- Emergency Operations Facility

The inspectors also assessed recognition of, and response to, abnormal and emergency plant conditions, the transfer of decision making authority and emergency function responsibilities between facilities, onsite and offsite communications, protection of emergency workers, emergency repair evaluation and capability, and the overall implementation of the emergency plan to protect public health and safety and the environment. The inspectors reviewed the current revision of the facility emergency plan, emergency plan implementing procedures associated with operation of the licensee's emergency response facilities, procedures for the performance of associated emergency functions, and other documents as listed in the attachment to this report.

The inspectors compared the observed exercise performance with the requirements in the facility emergency plan, 10 CFR 50.47(b), 10 CFR Part 50, Appendix E, and with the guidance in the emergency plan implementing procedures and other federal guidance.

The inspectors attended the postexercise critiques in each emergency response facility to evaluate the initial licensee self-assessment of exercise performance. The inspectors also attended a subsequent formal presentation of critique items to plant management. The specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one sample as defined in Inspection Procedure 71114.01-05.

b. Findings

No findings were identified.

**1EP6 Drill Evaluation (71114.06)**

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Training Observations

a. Inspection Scope

The inspectors observed a simulator training evolution for licensed operators on March 30, 2011, which required emergency plan implementation by a licensee operations crew. The primary event centered around a station blackout condition. This evolution was planned to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the postevolution critique for the scenario. The focus of the inspectors' activities was to note

any weaknesses and deficiencies in the crew's performance and ensure that the licensee evaluators noted the same issues and entered them into the corrective action program. As part of the inspection, the inspectors reviewed the scenario package and other documents listed in the attachment.

These activities constitute completion of one sample as defined in Inspection Procedure 71114.06-05.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstone: Occupational and Public Radiation Safety**

**2RS06 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)**

a. Inspection Scope

This area was inspected to: (1) ensure the gaseous and liquid effluent processing systems are maintained so radiological discharges are properly mitigated, monitored, and evaluated with respect to public exposure; (2) ensure abnormal radioactive gaseous or liquid discharges and conditions, when effluent radiation monitors are out-of-service, are controlled in accordance with the applicable regulatory requirements and licensee procedures; (3) verify the licensee's quality control program ensures the radioactive effluent sampling and analysis requirements are satisfied so discharges of radioactive materials are adequately quantified and evaluated; and (4) verify the adequacy of public dose projections resulting from radioactive effluent discharges. The inspectors used the requirements in 10 CFR Part 20; 10 CFR Part 50, Appendices A and I; 40 CFR Part 190; the Offsite Dose Calculation Manual, and licensee procedures required by the Technical Specifications as criteria for determining compliance. The inspectors interviewed licensee personnel and reviewed and/or observed the following items:

- Radiological effluent release reports since the previous inspection and reports related to the effluent program issued since the previous inspection

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- Effluent program implementing procedures, including sampling, monitor setpoint determinations and dose calculations
- Equipment configuration and flow paths of selected gaseous and liquid discharge system components, filtered ventilation system material condition, and significant changes to their effluent release points and associated 10 CFR 50.59 reviews
- Selected portions of the routine processing and discharge of radioactive gaseous and liquid effluents (including sample collection and analysis)

- Controls used to ensure representative sampling and appropriate compensatory sampling
  - Results of the inter-laboratory comparison program
  - Effluent stack flow rates
  - Surveillance test results of technical specification-required ventilation effluent discharge systems since the previous inspection
  - Significant changes in reported dose values
  - A selection of radioactive liquid and gaseous waste discharge permits
  - Part 61 analyses and methods used to determine which isotopes are included in the source term
  - Offsite dose calculation manual changes
  - Meteorological dispersion and deposition factors
  - Latest land use census
  - Records of abnormal gaseous or liquid tank discharges
  - Groundwater monitoring results
  - Changes to the licensee's written program for indentifying and controlling contaminated spills/leaks to groundwater
  - Identified leakage or spill events and entries made into 10 CFR 50.75 (g) records and associated evaluations of the extent of the contamination and the radiological source term
  - Offsite notifications and reports of events associated with spills, leaks, or groundwater monitoring results
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- Audits, self-assessments, reports, and corrective action documents related to radioactive gaseous and liquid effluent treatment since the last inspection

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of the one required sample, as defined in Inspection Procedure 71124.06-05.

b. Findings

No findings were identified.

**2RS07 Radiological Environmental Monitoring Program (71124.07)**

a. Inspection Scope

This area was inspected to: (1) ensure that the radiological environmental monitoring program verifies the impact of radioactive effluent releases to the environment and sufficiently validates the integrity of the radioactive gaseous and liquid effluent release program; (2) verify that the radiological environmental monitoring program is implemented consistent with the licensee's technical specifications and/or offsite dose calculation manual, and to validate that the radioactive effluent release program meets the design objective contained in Appendix I to 10 CFR Part 50; and (3) ensure that the radiological environmental monitoring program monitors non-effluent exposure pathways, is based on sound principles and assumptions, and validates that doses to members of the public are within the dose limits of 10 CFR Part 20 and 40 CFR Part 190, as applicable. The inspectors reviewed and/or observed the following items:

- Annual environmental monitoring reports and offsite dose calculation manual
  - Selected air sampling and thermoluminescence dosimeter monitoring stations
  - Collection and preparation of environmental samples
  - Operability, calibration, and maintenance of meteorological instruments
  - Selected events documented in the annual environmental monitoring report which involved a missed sample, inoperable sampler, lost thermoluminescence dosimeter, or anomalous measurement
  - Selected structures, systems, or components that may contain licensed material and has a credible mechanism for licensed material to reach ground water
  - Records required by 10 CFR 50.75(g)
- 
- Significant changes made by the licensee to the offsite dose calculation manual as the result of changes to the land census or sampler station modifications since the last inspection
  - Calibration and maintenance records for selected air samplers, composite water samplers, and environmental sample radiation measurement instrumentation
  - Interlaboratory comparison program results

- Audits, self-assessments, reports, and corrective action documents related to the radiological environmental monitoring program since the last inspection

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of the one required sample as defined in Inspection Procedure 71124.07-05.

b. Findings

No findings were identified.

**2RS08 Radioactive Solid Waste Processing, and Radioactive Material Handling, Storage, and Transportation (71124.08)**

a. Inspection Scope

This area was inspected to verify the effectiveness of the licensee's programs for processing, handling, storage, and transportation of radioactive material. The inspectors used the requirements of 10 CFR Parts 20, 61, and 71 and Department of Transportation regulations contained in 49 CFR Parts 171-180 for determining compliance. The inspectors interviewed licensee personnel and reviewed the following items:

- The solid radioactive waste system description, process control program, and the scope of the licensee's audit program
  - Control of radioactive waste storage areas including container labeling/markings and monitoring containers for deformation or signs of waste decomposition
  - Changes to the liquid and solid waste processing system configuration including a review of waste processing equipment that is not operational or abandoned in place
  - Radio-chemical sample analysis results for radioactive waste streams and use of scaling factors and calculations to account for difficult-to-measure radionuclides
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- Processes for waste classification including use of scaling factors and 10 CFR Part 61 analysis
  - Shipment packaging, surveying, labeling, marking, placarding, vehicle checking, driver instructing, and preparation of the disposal manifest
  - Audits, self assessments, reports, and corrective action reports radioactive solid waste processing, and radioactive material handling, storage, and transportation performed since the last inspection

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of the one required sample as defined in Inspection Procedure 71124.08-05.

b. Findings

- .1 Introduction. The inspectors identified a Green noncited violation of 10 CFR 70.42 (c) for failure to verify that a recipient of special nuclear material was authorized to receive the quantity of material shipped.

Description. On June 15, 2010, the licensee shipped laundry contaminated with radioactive material to a state licensed processing facility in Alabama. The licensee verified that the processing facility was licensed to handle the material being shipped, but failed to verify that the recipient's license authorized the quantity of material shipped. The shipment contained plutonium-241 in an amount which exceeded the processing facility license condition by 64 percent.

Licensee Procedure HTP-ZZ-09003, "Shipment of Radioactive Materials," Section 5.1 states, in part, prior to any shipment of radioactive material, determine that the consignee (receiver) is licensed to receive that material. However, the procedure does not give detailed guidance that the consignee must be licensed to receive the material in the type, form, and quantity being shipped.

As corrective action, the licensee notified the Alabama licensee of the issue and proposed revision to facility procedures to verify that recipients of licensed material are licensed to receive the material in the type, form, and quantity being shipped.

Analysis. The performance deficiency associated with this finding was failure to ship radioactive material in accordance with appropriate regulations. This finding was greater than minor because it was associated with the Public Radiation Safety Cornerstone attribute of program and process (transportation program), and affected the cornerstone objective in that license conditions were violated that are in place to control exposure to radiation. Using the public radiation safety significance determination process, the inspectors determined the finding had very low safety significance because (1) radiation limits were not exceeded, (2) there was no breach of a package during transit, (3) it did not involve a certificate of compliance issue, (4) it was not a low level burial ground nonconformance, and (5) it did not involve a failure to make notifications or provide emergency information. This finding had a cross-cutting aspect in the area of human performance, resources component, because licensee procedures were inadequate to ensure proper shipping of radioactive material and that license conditions were not violated [H.2(c)].

Enforcement. Title 10 of the Code of Federal Regulations 70.42(c) requires, "Before transferring special nuclear material to a specific licensee of the commission or an Agreement State or to a general licensee who is required to register with the Commission or with an Agreement State prior to receipt of the special nuclear material,

the licensee transferring the material shall verify that the transferee's license authorizes receipt of the type, form, and quantity of special nuclear material to be transferred." Contrary to the above, on June 15, 2010, the licensee did not, before transferring special nuclear material, verify that an agreement state licensee's license authorized receipt of the quantity of special nuclear material being transferred. The special nuclear material that was transferred exceeded the processing facility license condition by 64 percent. Because this finding had very low safety significance and was entered into the licensee's corrective action program as Callaway Action Request 201104385, the finding is being treated as a noncited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000483/2011003-04, "Failure to Verify Recipient's License Conditions Prior to Shipping Special Nuclear Material."

- .2 Introduction. The inspectors identified a Severity Level IV noncited violation of 10 CFR Part 50.71, "Maintenance of Records," because the licensee failed to update its Final Safety Analysis Report with submittals that include the effects of a change made to the facility.

Description. While inspecting the licensee's activities related to solid radwaste management and storage, the inspectors identified that the old steam generator storage facility was not described in Chapters 11 and 12 of the Final Safety Analysis Report. The licensee built the old steam generator storage facility on the owner controlled area for long-term radwaste storage of four decommissioned steam generators. Currently, the Final Safety Analysis Report, Chapters 11 and 12, Sections 11.4, "Solid Waste Management," and 12.2.1.7, "Stored Radioactivity," describe facilities for the interim storage of radioactive material, such as the dry active waste processing and resin handling system. Section 12.2.1.7 of the Final Safety Analysis Report also describes principal sources of radioactivity not enclosed by plant structures. This section included only the refueling water tank, the holdup tank, the reactor makeup water tank, and the condensate storage tank. The old steam generator storage facility was not described in the Final Safety Analysis Report.

The licensee is committed to Regulatory Guide 1.70, "Standard, Format, and Content of a Safety Analysis Report," Revision 3, which describes the content of Chapter 11, Section 11.4, "Solid Waste Management System." Regulatory Guide 1.70 states that this section should describe the capabilities of the plant to control, collect, handle, process, package, and temporarily store prior to shipment wet and dry solid radioactive waste generated as a result of normal operation, including anticipated operational occurrences. Regulatory Guide 1.70 also describes Chapter 12 of a safety analysis report and states that it should provide information on methods for radiation protection, estimated occupational radiation exposures to personnel during normal operation and anticipated operational occurrences including radioactive material handling, processing, use, and storage. Section 12.2.1, "Radiation Contained Sources," is the basis for the radiation protection design that should be described in the manner needed as input to the shield design calculations. Those sources that are contained in equipment like the radioactive waste management systems should be described. The source location in the plant should be specified so that all important sources of radioactivity can be located

on plant layout drawings. Also, the safety analysis report should provide a listing of isotope, quantity, form, and use of all sources that exceed 100 millicuries.

The old steam generator storage facility has been in use since fall 2005 and contains four decommissioned steam generators and other radioactive equipment in a separate compartment. Calculations for the construction of the facility were based on the assumption that each steam generator contained approximately 749 Curies of radioactive material. The old steam generator storage facility contains a significant source of radioactivity not described in the licensee's Final Safety Analysis Report.

Analysis. The performance deficiency associated with this finding was failure of the licensee to update the Final Safety Analysis Report to reflect changes made to the facility. This issue was dispositioned using traditional enforcement because it had the potential for impacting the NRC's ability to perform its regulatory function. The finding is more than minor because it has a material impact on licensed activities in that the four decommissioned steam generators, with a significant radioactive source term, have been relocated from the plant radiological controlled area to the owner controlled area. In addition, the radwaste management program has been affected because the licensee determined that this low-level radwaste facility will store these large components until an appropriate facility for disposal can be determined. The finding is characterized as a Severity Level IV, noncited violation in accordance with NRC Enforcement Policy, Section 6.1.

Enforcement. Title 10 CFR 50.71, "Maintenance of Records," Section (e), requires, in part, that licensees periodically update their Final Safety Analysis Report with submittals that include the effects of all changes made in the facility or procedures as described in the Final Safety Analysis Report and all safety analyses and evaluations performed by the licensee in support of conclusions that changes did not require a license amendment in accordance with 10 CFR 50.59(c)(2). Contrary to this requirement, from the fall 2005 through June 2011, the licensee made changes to the facility, but failed to update the Final Safety Analysis Report to include these changes. Specifically, the licensee built the old steam generator storage facility for storing radioactive waste (four old steam generators and other radioactive equipment) on the owner controlled site for long-term storage. Because the finding was a Severity Level IV violation and has been entered into licensee corrective action program as Callaway Action Request 201104434, the finding is being treated as a noncited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000483/2011003-05, "Failure to Periodically Update the Final Safety Analysis Report."

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#### 4. OTHER ACTIVITIES

##### 4OA1 Performance Indicator Verification (71151)

###### .1 Data Submission Issue

###### a. Inspection Scope

The inspectors performed a review of the data submitted by the licensee for the first quarter 2011 performance indicators for any obvious inconsistencies prior to its public release in accordance with Inspection Manual Chapter 0608, "Performance Indicator Program."

This review was performed as part of the inspectors' normal plant status activities and, as such, did not constitute a separate inspection sample.

###### b. Findings

No findings were identified.

###### .2 Safety System Functional Failures (MS05)

###### a. Inspection Scope

The inspectors sampled licensee submittals for the safety system functional failures performance for the period from the second quarter 2010 through the first quarter 2011. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73." The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports, and NRC integrated inspection reports for the period of April 2010 through March 2011 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

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These activities constitute completion of one safety system functional failures sample as defined in Inspection Procedure 71151-05.

###### b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index - Heat Removal System (MS08)

a. Inspection Scope

The inspectors sampled licensee submittals for the mitigating systems performance index - heat removal system performance indicator for the period from the second quarter 2010 through the first quarter 2011. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, mitigating systems performance index derivation reports, and NRC integrated inspection reports for the period of April 2010 through March 2011 to validate the accuracy of the submittals. The inspectors reviewed the mitigating systems performance index component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one mitigating systems performance index - heat removal system sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings were identified.

.4 Reactor Coolant System Leakage (BI02)

a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system leakage performance indicator for the period from the second quarter 2010 through the first quarter 2011. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors reviewed the licensee's operator logs, reactor coolant system leakage tracking data, issue reports, event reports, and NRC integrated inspection reports for the period of April 2010 through March 2011 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one reactor coolant system leakage sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings were identified.

.5 Drill/Exercise Performance (EP01)

a. Inspection Scope

The inspectors sampled licensee submittals for the Drill and Exercise Performance, performance indicator for the period July 2010 through March 2011. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revisions 5 and 6, were used. The inspectors reviewed the licensee's records associated with the performance indicator to verify that the licensee accurately reported the indicator in accordance with relevant procedures and the Nuclear Energy Institute guidance. Specifically, the inspectors reviewed licensee records and processes including procedural guidance on assessing opportunities for the performance indicator; assessments of performance indicator opportunities during designated control room simulator training sessions, performance during the 2011 biennial exercise, and performance during other drills. The specific documents reviewed are described in the attachment to this report.

These activities constitute completion of the drill/exercise performance sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings were identified.

.6 Emergency Response Organization Drill Participation (EP02)

a. Inspection Scope

The inspectors sampled licensee submittals for the Emergency Response Organization Drill Participation performance indicator for the period July 2010 through March 2011. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revisions 5 and 6, were used. The inspectors reviewed the licensee's records associated with the performance indicator to verify that the licensee accurately reported the indicator in accordance with relevant procedures and the Nuclear Energy Institute guidance. Specifically, the inspectors reviewed licensee records and processes including procedural guidance on assessing opportunities for the performance indicator, rosters of personnel assigned to key emergency response organization positions, and exercise participation records. The specific documents reviewed are described in the attachment to this report.

These activities constitute completion of the emergency response organization drill participation sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings were identified.

.7 Alert and Notification System (EP03)

a. Inspection Scope

The inspectors sampled licensee submittals for the Alert and Notification System performance indicator for the period July 2010 through March 2011. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revisions 5 and 6, were used. The inspectors reviewed the licensee's records associated with the performance indicator to verify that the licensee accurately reported the indicator in accordance with relevant procedures and the Nuclear Energy Institute guidance. Specifically, the inspectors reviewed licensee records and processes including procedural guidance on assessing opportunities for the performance indicator and the results of periodic alert notification system operability tests. The specific documents reviewed are described in the attachment to this report.

These activities constitute completion of the alert and notification system sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings were identified.

**40A2 Identification and Resolution of Problems (71152)**

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Physical Protection**

~~.1 Routine Review of Identification and Resolution of Problems~~

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that they were being entered into the licensee's corrective action program at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. The inspectors reviewed attributes that included the complete and accurate identification of the problem; the timely correction, commensurate with the safety

significance; the evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent of condition reviews, and previous occurrences reviews; and the classification, prioritization, focus, and timeliness of corrective actions. Minor issues entered into the licensee's corrective action program because of the inspectors' observations are included in the attached list of documents reviewed.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure, they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's corrective action program. The inspectors accomplished this through review of the station's daily corrective action documents.

The inspectors performed these daily reviews as part of their daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings were identified.

.3 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors focused their review on repetitive equipment issues, but also considered the results of daily corrective action item screening discussed in Section 4OA2.2 above, licensee trending efforts, and licensee human performance results. The inspectors nominally considered the 6-month period of January 2011 through June 2011 although some examples expanded beyond those dates where the scope of the trend warranted.

The inspectors also included issues documented outside the normal corrective action program in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance

audit/surveillance reports, self-assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's corrective action program trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

These activities constitute completion of one semi-annual trend inspection sample as defined in Inspection Procedure 71152-05.

b. Findings

The inspectors found that the licensee identified the following trends of significance:

- Callaway Action Request 201101297, Fitness for duty timekeeping reporting errors
- Callaway Action Request 201104061, Concern in operations training program

The resident inspectors concurred with these items as being noteworthy trends needing additional corrective actions. Additionally, the inspectors noted the adverse human performance trend noted in Inspection Report 2010005 has continued.

An additional inspector-identified adverse trend was:

- Inadequate licensee evaluations/analyses associated with postulated high-energy line breaks and flooding

The licensee entered this issue into their corrective action program as Callaway Action Request 201105608 and took additional actions to address this trend, including developing additional training for engineers related to line breaks and conducting extensive walkdowns to identify potential vulnerabilities in the plant.

4. Selected Issue Follow-up Inspection

a. Inspection Scope

During a review of items entered in the licensee's corrective action program, the inspectors identified a corrective action item documenting:

- Callaway Action Request 201103302, Degraded grease discovered in atmospheric steam dump manual isolation valves
- Callaway Action Requests 201009339 and 201104650, Inadequate stem lubrication of safety related motor-operated valves

These activities constitute completion of two in-depth problem identification and resolution samples as defined in Inspection Procedure 71152-05.

b. Findings and Observations

The inspectors determined that the licensee had not appropriately followed their Generic Letter 89-10 program for safety related motor-operated valves. The licensee's program is based on periodic verification that performs a static diagnostic test every six years or four refueling outages. Additionally, for torque-controlled rising-stem valves that do not have at least 25 percent capability margin above their design operating requirements, a static diagnostic test is performed every refueling cycle and a dynamic test is performed every three refueling outages. The testing frequency is established with the assumption that stem lubrication is performed every 18 months as documented in the licensee's Generic Letter 96-05 response. The licensee failed to meet the stem lubrication requirement for fifteen valves within the scope of Generic Letter 89-10. Since these valves all had at least 25 percent capability margin above their design operating requirements, the inspectors determined this to be a minor violation of the licensee's motor-operated valve program. The licensee entered this issue into their corrective action program as Callaway Action Request 201104650. Immediate corrective actions were implemented to lubricate the stems of the fifteen valves that had exceeded the 18 month lubrication requirement.

.5 In-depth Review of Operator Workarounds

a. Inspection Scope

During a review of items entered in the licensee's corrective action program, the inspectors reviewed an operator workaround associated with:

- Callaway Action Request 201104102, Safety Injection test header placed inservice to minimize reactor coolant system check valve in-leakage to train A safety injection accumulator. This abnormal lineup was not considered an operator workaround by the licensee.

This activity constitutes completion of one operator workaround inspection sample as part of the annual in-depth problem identification and resolution samples defined in Inspection Procedure 71152-05.

b. Findings

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One licensee identified finding associated with an inadequate initial operability review was identified. See Section 4OA7.

**4OA3 Event Follow-up (71153)**

.1 Reactivity Excursion due to Excessive Boration

a. Inspection Scope

The inspectors reviewed the plant's response to an event on May 27, 2011, associated with the charging pump suction swapover to the refueling water storage tank and

subsequent power reduction. Documents reviewed in this inspection are listed in the attachment.

This inspection constitutes one sample as defined in Inspection Procedure 71153-05.

b. Findings

Introduction. A Green self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," was identified when the licensee's failure to correctly follow a test procedure resulted in a negative reactivity excursion due to excessive boration.

Description. On May 27, 2011, with the Callaway Plant at 100 percent power, maintenance was in progress to perform a functional test of the plant's safety system trip actuating devices. Procedure ISF-SB-00A29, "SSPS TRN A Functional Test," Step 6.2.4.a, directed the instrument maintenance technicians to place the mode selector switch in the "test" position. This step was not performed, and subsequent insertion of the test signals resulted in a boron dilution mitigation system response to switch the charging pump suction paths from the volume control tank to the refueling water storage tank. The charging pumps' normal suction paths are kept at about the same boron concentration as the reactor coolant system. However, the refueling water storage tank boron concentration this day was about 1800 ppm higher than the reactor coolant system. The inadvertent actuation resulted in a reactivity excursion that required a lowering of main turbine power and reactor power to about 92 percent to counter the negative reactivity added by the higher boron concentration. The crew stabilized the plant and returned critical parameters to their normal control bands.

Analysis. The performance deficiency associated with this finding was a failure to follow procedural guidance that resulted in a plant transient. This finding is more than minor because it was associated with the configuration control attribute of the Initiating Events Cornerstone and affected the associated cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operations. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding was determined to be of very low safety significance since it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available. This finding had a cross-cutting aspect in the area of human performance associated with the work practices component because the instrument maintenance technicians failed to adequately use human error prevention techniques, such as self- and peer-checking to ensure that work activities are performed safely [H.4(a)].

Enforcement. Technical Specification 5.4.1.a, "Procedures," required that written procedures be established, implemented and maintained covering the activities specified in Appendix A, "Typical Procedures for Pressurized Water Reactors," of Regulatory Guide 1.33, "Quality Assurance Program Requirements," February 1978. Appendix A, Item 8.b, required procedures for technical specifications surveillance testing. Procedure ISF-SB-00A29, "SSPS TRN A Functional Test," was a technical specification implementing procedure. Contrary to the above, on May 27, 2011, instrument maintenance department personnel's failure to correctly implement

Procedure ISF-SB-00A29, "SSPS TRN A Functional Test," resulted in a plant reactivity excursion. Because this finding is of very low safety significance and was entered into the licensee's corrective action program as Callaway Action Request 201104451, this violation is being treated as a noncited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000483/2011003-06, "Failure to Correctly Implement a Plant Safety System Test Procedure."

.2 (Closed) Licensee Event Report 2010-010-00: Violation of Technical Specification 3.0.3 due to 'B' Class 1E Electrical Equipment A/C Unit Inoperability

On September 21, 2010, the licensee's nuclear oversight department initiated Callaway Action Request 201009024 to document that the licensee's interpretation of the Callaway Final Safety Analysis Report, Section 16.7.13 incorrectly allowed for one train of Class 1E electrical equipment air conditioning units to be removed from service for up to seven days before declaring the affected electrical equipment inoperable. On November 29, 2010, the inspectors reviewed the licensee's reportability evaluation and identified that the licensee failed to consider the event described in Callaway Action Request 200800615 as a potentially reportable condition. Specifically, the event described in Callaway Action Request 200800615 documented a period where the class 1E electrical equipment air conditioning unit train B was inoperable for approximately 37 hours which exceeded the technical specification allowed completion time of the equipment supported by the Class 1E electrical equipment. The inspectors had previously identified a violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," for failure to follow procedure APA-ZZ-00500, Appendix 1, "Operability and Functionality Determinations." Additionally, the inspectors had previously identified the licensee's failure to make a required licensee event report per the requirements of 10 CFR 50.73(a)(2)(i)(b), "Any operation or condition which was prohibited by the plant's technical specifications." The enforcement aspects of these violations are discussed in section 1R15 of inspection report 05000483/2011002. No additional violations were identified during the inspectors' review. This licensee event report is closed.

#### 40A5 Other Activities

.1 (Closed) NRC Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event"

a. Inspection Scope

The inspectors assessed the activities and actions taken by the licensee to assess its readiness to respond to an event similar to the Fukushima Daiichi nuclear plant fuel damage event. This included (1) an assessment of the licensee's capability to mitigate conditions that may result from beyond design basis events, with a particular emphasis on strategies related to the spent fuel pool, as required by NRC Security Order Section B.5.b issued February 25, 2002, as committed to in Severe Accident Management Guidelines (SAMGs), and as required by 10 CFR 50.54(hh); (2) an assessment of the licensee's capability to mitigate station blackout conditions, as required by 10 CFR 50.63 and station design bases; (3) an assessment of the licensee's capability to mitigate

internal and external flooding events, as required by station design bases; and (4) an assessment of the thoroughness of the walkdowns and inspections of important equipment needed to mitigate fire and flood events, which were performed by the licensee to identify any potential loss of function of this equipment during seismic events possible for the site.

b. Findings

Inspection Report 05000483/2011008 (ML11133A171) documented detailed results of this inspection activity. Following issuance of the report, the inspectors conducted detailed follow-up on selected issues. Section 1R06 of this report documents a finding that was identified during this follow-up inspection.

.2 (Closed) NRC Temporary Instruction 2515/184, "Availability and Readiness Inspection of Severe Accident Management Guidelines (SAMGs)"

On May 18, 2011, the inspectors completed a review of the licensee's SAMGs, implemented as a voluntary industry initiative in the 1990's, to determine (1) whether the SAMGs were available and updated, (2) whether the licensee had procedures and processes in place to control and update its SAMGs, (3) the nature and extent of the licensee's training of personnel on the use of SAMGs, and (4) licensee personnel's familiarity with SAMG implementation.

The results of this review were provided to the NRC task force chartered by the Executive Director for Operations to conduct a near-term evaluation of the need for agency actions following the Fukushima Daiichi fuel damage event in Japan. Plant-specific results for the Callaway Plant were provided as Enclosure 2 to a memorandum to the Chief, Reactor Inspection Branch, Division of Inspection and Regional Support, dated May 27, 2011 (ML111470264).

## **4OA6 Meetings**

### Exit Meeting Summary

On May 12, 2011, the inspectors presented the results of the inspection of the licensee's biennial emergency preparedness exercise to Mr. D. Neterer, Plant Director, and other members of the licensee's staff. ~~The licensee acknowledged the issues presented. The~~ inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

On May 27, 2011, the inspectors presented the results of the radiation safety inspections to Mr. F. Diya, Vice President Nuclear Operations, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

On June 22, 2011, the inspectors presented the inspection results to Mr. C. Reasoner, Vice President, Engineering, and other members of the licensee staff. The licensee acknowledged

the issues presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

#### **4OA7 Licensee-Identified Violations**

The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of Section 2.3.2 of the NRC Enforcement Policy for being dispositioned as noncited violations. Documents reviewed in this inspection are listed in the attachment.

- Title 10 of the Code of Federal Regulations Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of structures, systems and components. Contrary to the above, prior to March 23, 2011, the licensee failed to establish the suitability of equipment located in the room 1206/1207 to function following a potential high-energy line break in nonnuclear, nonseismically analyzed auxiliary steam piping. The harsh environment from a high-energy line break had the potential to impact safety related level transmitters associated with the auxiliary feedwater loss of suction pressure transmitters ALPT0037, 38, and 39. This finding was entered in the licensee's corrective action program as Callaway Action Request 201102329. Initial corrective action from the callaway action request demonstrated the piping was qualified to ASME Section III stress limits which allowed excluding intermediate pipe breaks. This finding was of very low safety significance since subsequent evaluation concluded the issue was a design or qualification deficiency confirmed not to result in loss of operability or functionality.
- Title 10 of the Code of Federal Regulations Part 50, Appendix B, Criterion V, "Procedures," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. On January 31, 2011, a licensee immediate operability evaluation failed to consider the potential effect of voiding discovered in the train A safety injection accumulator's fill line. On May 18, 2011, the licensee monthly void check surveillance, OSP-SA-00003, discovered the safety injection pump discharge header high point vent had more than normal voiding. An extent of condition check revealed that upstream of the high point vent the amount of voiding exceeded the licensee's operability acceptance criteria. The licensee's initial operability reviews failed to consider the accumulator fill line voiding as possibly affecting train A safety injection header operability per licensee Procedure APA-ZZ-00500, Appendix 1, Step 4.1.1. Initial corrective action was increased void monitoring and venting frequencies and manual isolation of the accumulator fill line from the pump discharge header. This finding was entered in the licensee's corrective action program as Callaway Action Requests 201100850 and 201104102. This finding was of very low safety significance since it did not represent actual loss of safety function of a single train for greater than its Technical Specification allowed outage time, did not represent an actual loss of safety

function and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee Personnel

- K. Bruckerhoff, Assistant Manager, Protective Services
- J. Carter, Health Physicist, Radiation Protection
- W. Chambers, Manager, Emergency Preparedness, DC Cook
- C. Emerson, Supervisor, Radiation Protection
- J. Fortman, Supervising Engineer, Engineering Projects-Mechanical
- S. Gordon, Engineer, Nuclear Engineering Systems
- C. Graham, Health Physicist, Radiation Protection
- L. Graessle, Director, Plant Support
- S. Hogan, Assistant Manager, Protective Services
- J. Houston, Health Physicist, Radiation Protection
- B. Huhmann, Supervising Engineer, Mechanical/Civil Design
- S. Maglio, Manager, Regulatory Affairs
- P. McKenna, Manager, Outages
- D. Neterer, Plant Director
- S. Petzel, Engineer, Regulatory Affairs
- J. Pitts, Supervising Engineer, Performance Engineering
- C. Reasoner, Vice President, Engineering
- A. Schnitz, Engineer, Regulatory Affairs
- C. Smith, Acting Manager, Radiation Protection

#### NRC Personnel

- J. Dykert, Reactor Engineer

### LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

#### Opened and Closed

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- |                     |     |  |
|---------------------|-----|--|
| 05000483/2011003-01 | NCV | Failure to Maintain an Adequate Flooding Analysis for Room 3101 (Section 1R06)                                       |
| 05000483/2011003-02 | NCV | Failure to Analyze Refueling Water Storage Tank Level Transmitters for High-Energy Line Break (Section 1R15)         |
| 05000483/2011003-03 | NCV | Failure to Adequately Establish Test Program for Isolation Valves in Post-LOCA Recirculation Flowpath (Section 1R22) |

05000483/2011003-04 NCV Failure to Verify Recipient's License Conditions Prior to Shipping Special Nuclear Material (Section 2RS08)

05000483/2011003-05 NCV Failure to Periodically Update the Final Safety Analysis Report (Section 2RS08)

05000483/2011003-06 NCV Failure to Correctly Implement a Plant Safety System Test Procedure (Section 4OA3)

Closed

05000483/2010-010-00 LER Violation of Technical Specification 3.0.3 due to 'B' Class 1E Electrical Equipment A/C Unit Inoperability

**LIST OF DOCUMENTS REVIEWED**

**Section 1RO1: Adverse Weather Protection**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
OSP-NB-00001	Class 1E Electrical Source Verification	35
OTO-SG-00001	Seismic Event	17
OTO-ZZ-00012	Severe Weather	21

CALLAWAY ACTION REQUESTS

201001515	201101808	201003582	201007857	201100595
201001962	201101253	201101853	201102411	201102957
201007985				

JOBS

11000356	10001457
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MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
SVR 10001859	Service Request/ PM for switchyard walkdowns	April 16, 2010
Calculation ZZ-62	Plant Load Flow Calculation	9

**Section 1RO4: Equipment Alignment**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
OSP-BG-00001	Boron Injection Flow Paths – Modes 1,2, and 3	22
OTS-GS-00001	Containment H2 Recombiner Functional Test	0
MPE-GS-QG01B	Hydrogen Recombiner SGS01B Inspection	0
MPE-GS-QG01A	Hydrogen Recombiner SGS01A Inspection	0
ESP-GK-0001B	Control Room Habitability Test 'B' Train	1
ESP-GK-0001A	Control Room Habitability Test 'A' Train	1
ECA-0.0	Loss of All AC Power	13
BD-ECA-0.0	Loss of All AC Power	6
EOP Addendum 23	Local CST Emergency Fill	3

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DRAWINGS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
M-22AL01(Q)	Piping and Instrumentation Diagram Auxiliary Feedwater System	36

CALLAWAY ACTION REQUESTS

200408558      201104682

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
RFR 15703	Document Basis for Boration Flowpaths	C
WPA # 81311	Steam generator blowdown holdoff	June 8, 2011
Job 08510111	Containment H2 Recombiner Functional Test	May 13, 2010
Job 07504870	Containment H2 Recombiner Functional Test	September 25, 2008
Job 07500793	Containment H2 Recombiner Functional Test	April 17, 2007
Job 08512646	Hydrogen Recombiner SGS01A Inspection	May 18, 2010
Job 10511213	Control Room Habitability Test 'B' Train	May 15, 2011
Calculation BO-04	Condensate Storage Tank Inventory for a Four Hour Station Blackout.	3
ULNRC-05427	AmerenUE letter to the NRC, RAI concerning Generic Letter 2003-01, Control Room Habitability	July 16, 2007

**Section 1RO5: Fire Protection**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
APA-ZZ-00703	Fire Protection Operability Criteria and Surveillance Requirements	19
APA-ZZ-00741	Control of Combustible Materials	19
FPP-ZZ-00001	Auxiliary Building Prefire Strategies	22

CALLAWAY ACTION REQUESTS

201104251

**Section 1R06: Flood Protection Measures**

DRAWINGS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
C-U203(Q)	ESWS, Units 1 & 2 Electrical Manholes Plans, Sections and Details	6
E-UR0221(Q)	Raceway Plot Plan Essential Service Water System Plan and Sections	9

CALLAWAY ACTION REQUESTS

201102957      201102691

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
Job 09513130	Manhole MH01 inspection	May 18, 2011
XX-49	Maximum Control Building Flood Level for Room 3101	1
NUREG-0800 3.6.2	Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping	1
MP-07-0066	Installation of safety related High Density Polyethylene Essential Service Water Piping	0

**Section 1R11: Licensed Operator Requalification Program**

PROCEDURES

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<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EIP-ZZ-001101	Classification of Emergencies	47
CSF-1	Critical Safety Function Status Trees (CSFST)	9
E-0	Reactor Trip or Safety Injection	

EIP-ZZ-00101 Addendum 1	Emergency Action Level Classification Matrix	0
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MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
DS-29 simulator scenario	Loss of offsite power	n/a
DS 40 simulator scenario	Steam generator tube rupture	n/a

**Section 1R12: Maintenance Effectiveness**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EDP-ZZ-01128	Maintenance Rule Program	17
EDP-ZZ-01128, Appendix 4	Maintenance Rule System Functions	5

CALLAWAY ACTION REQUESTS

200902505	200909190	201006320	201007822	201100668
201101583	201101882	201102292	201102251	201103099
201103797	201103779	201103800		

MISCELLANEOUS DOCUMENTS

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<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
AUCA 11-033	Event Review Team meeting summary for PAP01, NSAFP mechanical seal leakage	5/13/2011
	Risk Significant SSC Unavailability Spreadsheet for Period 12/1/09 to 5/31/11	5/31/11

**Section 1R13: Maintenance Risk Assessment and Emergent Work Controls**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EDP-ZZ-01129	Callaway Plant Risk Assessment	26
EDP-ZZ-01129, Appendix 2	Risk Management Actions for Planned Risk-Significant Activities	18

CALLAWAY ACTION REQUESTS

201103736

**Section 1R15: Operability Evaluations**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
APA-ZZ-00500, Appendix 1	Operability and Functionality Determinations	12

DRAWINGS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
C-2029	Civil Structural Standard Details Sheet No. 33	5
M-28FB19	Hanger Details Small Pipes Steam Htg. Coil and Header Arrgt. R.W.S.T and R.M.W.S.T.	6
M-29FB20	Hanger Location Dwg. Small Pipe Steam Htg. Coil and Header Arrgt. R.W.S.T and R.M.W.S.T. – (Details and Sect's)	0

CALLAWAY ACTION REQUESTS

201102329	201102391	201102588	201102619	20112729
201102957	201104266			

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
Regulatory Guide 1.60	Design Response Spectra for Seismic Design of Nuclear Power Plants	1
10466-C-04A10B	Floor Response Spectra for Standardized Nuclear Unit Power Plant System (SNUPPs)	1
	SAR Change Notice No. 26-86/C	February 4, 1986

**Section 1R18: Plant Modifications**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
OSP-SA-0017A	Train A SIS-CSAS Slave Relay Test	28

DRAWINGS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
M23-EG06	Piping Isometric, Component Cooling Water Sys. Aux Building Common Header	5

CALLAWAY ACTION REQUESTS

201102156      201102299

JOBS

11000644      11000645      10008819

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MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
10-0042	Component cooling water check valve EG0447 installation modification	

MP 10-0038	Alternate Emergency Power System	0
IEEE Std 384	IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits	2008

**Section 1R19: Postmaintenance Testing**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
MPM-ZZ-QV014	Masoneilan Valve and Actuator Overhaul – 40000 Series	25
OSP-BM-V001A	S/G Blowdown System Valve Operability	13

CALLAWAY ACTION REQUESTS

201104764	201104774	201104904	201104969
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JOBS

06520513	08503432	09511426	11001489	11003154
11003257	11003314			

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
	Valve Retest Manual	46

**Section 1R22: Surveillance Testing**

PROCEDURES

---

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
ESP-ZZ-00356	Technical Specification 5.5.2.B Verification Integrated Leak Rate Requirements for Primary Coolant Sources Outside Containment	6
ETP-ZZ-00003	Inspection of New Fuel	17
ISF-SB-00A29	SSPS Trn A Functional Test	29

OSP-AL-P0002	TDAFP Inservice Testing	60
OSP-BN-V0003	BNHV8813 Inservice Test	4
OSP-BN-V0004	BN8717 Inservice Test	4
OSP-EM-V0004	RHR Check Valve and SI Pump Recirc Valve Inservice Test	19
OSP-KC-03003	Fire Main Flow Test	4
OSP-SJ-V0001	Section XI Nuclear Sample System Isolation Valve Operability	10
OSP-SA-0009A	Train A CISA Slave Relay Test	15

JOBS

08512538	08513261	10510165	11001481	11002061
11501633				

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>
NFPA 25	Inspection, Testing, and Maintenance of Water-Based Extinguishing Systems

**Section 1EP1: Exercise Evaluation**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EIP-ZZ-00101	Classification of Emergencies	47
EIP-ZZ-00102	Emergency Implementing Actions	45
EIP-ZZ-00200	Augmentation of the Emergency Response Organization	15
EIP-ZZ-00201	Notifications	48
EIP-ZZ-00201A	Control Room Notification Flowchart	12
EIP-ZZ-00201C	EOF Notification Package	12

EIP-ZZ-00212	Protective Action Recommendations	23
EIP-ZZ-00230	Accountability	32
EIP-ZZ-00240	Technical Support Center Operations	40
EIP-ZZ-1211T	Accident Dose Assessment	0
EIP-ZZ-C0010	Emergency Operations Facility Operations	37

EVALUATION REPORTS

Evaluation Report for the Drill conducted August 8, 2007

Evaluation Report for the February 19, 2009, Notification of Unusual Event

Evaluation Report for the Drill conducted October 20, 2009

Evaluation Report for the April 13, 2010, Notification of Unusual Event

Evaluation Report for the Drill conducted September 8, 2010

Evaluation Report for the Drill conducted September 15, 2010

Evaluation Report for the Drill conducted September 22, 2010

Evaluation Report for the Drill conducted September 29, 2010

Evaluation Report for the Drill conducted October 6, 2010

Evaluation Report for the Drill conducted October 13, 2010

Evaluation Report for the Drill conducted December 1, 2010

Evaluation Report for Drill conducted March 30, 2011

CALLAWAY ACTION REQUESTS

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200909770	200910291	200919260	201000436	201000485
201002502	201002515	201002573	201002978	201005238
201006466	201006694	201008164	201008348	201008554
201008883	201009065	201009087	201009591	201009761
201101180	201101429	201101933	201103918	201103919
201103920	201103921	201103922	201103923	201103924
201103925	201103926	201103927	201103928	201103932

201103933	201103935	201103936	201103937	201103938
201103944	201103945	201103947	201103953	201103954
201103957	201103959	201103960	201103963	201103966
201103968	201103969			

**Section 1EP6: Drill Evaluation**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
ECA-0.0	Loss of All AC Power	13
BD-ECA-0.0	Loss of All AC Power	6

**Section 2RS06: Radioactive Gaseous and Liquid Effluent Treatment**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
CTP-SJ-01120	Radwaste Sample Station (SJ-144) Operation	18
HSP-SS-00005	Radioactive Gaseous Effluent Dose Rate	19
HTP-ZZ-02006	Liquid Radwaste Release Permit (Batch)	74
HTP-ZZ-02007	Gaseous Radwaste Release Permit (Gas Decay Tank)	38
HTP-ZZ-3005	Airborne Tritium Sampling	15
HTP-ZZ-3006	Use of Airborne Sampling Cart	26
HTP-ZZ-06020	Count Room Analytic and Quality Control Calculations and Methods	17

AUDITS, SELF-ASSESSMENTS, AND SURVEILLANCES

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
AP10-008	Nuclear Oversight Audit of Environmental Monitoring	September 23, 2010

201100569-11 Self-Assessment – Preparation of the Annual Radiological Effluent Release Report May 23, 2011

CALLAWAY ACTION REQUESTS

200905595	200910397	201000698	201008424	201009085
201009636	201011132	201100444	201102565	

10 CFR 50.75 g CONDITION REPORTS

None reported

RELEASE PERMITS

RP10-2011-L0004;1 RP13-2010-G0002; 12 RP-12-2011-G0001; 15 RP12-2011-G0001;24

COMPENSATORY SAMPLING

<u>MONITOR</u>	<u>DATE</u>
GTRE0021A – Unit Vent	March 7 through April 1, 2011
GHRE0010A-Radwaste Vent	March 5 through March 12, 2010

AIR CLEANING SYSTEM SURVEILANCE RECORDS

<u>SYSTEM</u>	<u>TRAIN</u>	<u>TEST</u>	<u>DATE</u>
FGK01	A	HEPA and Charcoal	August 16, 2010
FGK01	A	Laboratory Charcoal	March 18, 2011
FGK01	B	HEPA and Charcoal	October 1, 2010
FGK01	B	Laboratory Charcoal	August 24, 2010
FGK02	A	HEPA and Charcoal	February 23, 2011
FGK02	A	Laboratory Charcoal	March 18, 2011
FGK02	B	HEPA and Charcoal	August 4, 2011
FGK02	B	Laboratory Charcoal	August 13, 2010
FGG02	A	HEPA and Charcoal	March 3, 2011
FGG02	A	Laboratory Charcoal	March 23, 2010
FGG02	B	HEPA and Charcoal	January 13, 2011
FGG02	B	Laboratory Charcoal	February 7, 2011

MISCELLANEOUS DOCUMENTS

2009 Radioactive Effluent Release Report

Callaway Plant 2010 Callaway Plant Annual Effluent Release Report

**Section 2RS07: Radiological Environmental Monitoring Program**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
HDP-ZZ-07000	Radiological Environmental Monitoring Program and Groundwater Protection Initiative	Minor Revision 2
HDP-ZZ-07101	REMP Sample Locations and Analysis Schedule	Major Revision 5
HTP-ZZ-04143	Operation of the Portland River Water Composite Sampler	Major Revision 2
HTP-ZZ-07001	Collection and Shipping of Environmental Crop Samples	Minor Revision 1
HTP-ZZ-07001	Collection and Shipping of Environmental Crop Samples	Minor Revision 2
HTP-ZZ-07001	Collection and Shipping of Direct Radiation Environmental Samples	Minor Revision 3
HTP-ZZ-07001	Collection and Shipping of Environmental Soil Samples	0
HTP-ZZ-07001	Collection and Shipping of Environmental Sediment Samples	0
HTP-ZZ-07001	Collection and Shipping of Environmental Fish Samples	0
HTP-ZZ-07001	Collection and Shipping of Environmental Water Samples	Minor Revision 5
HTP-ZZ-07001	Collection and Shipping of Environmental Air Samples	Minor Revision 2
HTP-ZZ-07001	Collection and Shipping of Environmental Raw Milk Samples	0

HTP-ZZ-07001	Collection and Shipping of Environmental Raw Milk Samples	Minor Revision 1
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AUDITS, SELF-ASSESSMENTS, AND SURVEILLANCES

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
AP10-008	Nuclear Oversight Audit of Environmental Monitoring	September 23, 2010

CALLAWAY ACTION REQUESTS

201103554	201102543	201103559	201103558	201103557
201103555	201103553	201104347	201104343	20008363
201008021	201002971	200905927	200905050	200909020
201001977	201004731	201006502	201006574	201007487
201008952	201010482	201101355		

CALIBRATION AND MAINTENANCE RECORDS

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
10509116/500	RD01/ Primary Met Tower	June 8, 2010
10509117/500	RD01/ Primary Met Tower	June 8, 2010
09512698/500	RD01/ Primary Met Tower	November 24, 2009
09513698/500	RD01/ Primary Met Tower	December 9, 2009

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
2010	Radiation Environmental Operating Report	January 1, 2010 – December 31, 2010
2009	Radiation Environmental Operating Report	January 1, 2009 – December 31, 2009
CA1349	Environmental Sample Collection Data Sheet	May 10, 2011
CA1349	Environmental Sample Collection Data Sheet	May 24, 2011
CA1349	Environmental Sample Collection Data Sheet	November 9, 2010
CA1349	Environmental Sample Collection Data Sheet	October 12, 2010
CA1349	Environmental Sample Collection Data Sheet	September 29, 2010
CA1349	Environmental Sample Collection Data Sheet	September 14, 2010
CA1349	Environmental Sample Collection Data Sheet	August 10, 2010

CA1349	Environmental Sample Collection Data Sheet	July 13, 2010
CA1349	Environmental Sample Collection Data Sheet	June 22, 2010
CA1349	Environmental Sample Collection Data Sheet	November 10, 2009
CA1349	Environmental Sample Collection Data Sheet	October 13, 2009
CA1349	Environmental Sample Collection Data Sheet	September 8, 2009
CA1349	Environmental Sample Collection Data Sheet	July 28, 2009
CA1349	Environmental Sample Collection Data Sheet	July 14, 2009
CA1349	Environmental Sample Collection Data Sheet	June 23, 2009
CA1349	Environmental Sample Collection Data Sheet	June 9, 2009
CA1349	Environmental Sample Collection Data Sheet	May 26, 2009
CA1349	Environmental Sample Collection Data Sheet	May 12, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	May 24, 2011
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	May 10, 2011
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	March 8, 2011
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	February 8, 2011
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	December 14, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	November 23, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	November 9, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	October 26, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	October 12, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	September 28, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	September 14, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	August 24, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	August 10, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	July 27, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	July 13, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	June 22, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	April 13, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	March 9, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	February 9, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	January 12, 2010
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	December 8, 2009

CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	November 24, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	November 10, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	October 27, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	October 13, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	September 22, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	September 8, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	August 24, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	July 28, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	July 14, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	June 23, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	June 9, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	May 26, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	May 12, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	April 29, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	April 14, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	March 10, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	February 10, 2009
CA 0427	Callaway Environmental Mile & Water Sample Data Sheet	January 13, 2009
HPCI-09-06	Evaluation of the 2009 Annual Land Use Census	0
HPCI-10-03	Evaluation of the 2010 Annual Land Use Census	0

**Section 2RS08: Radioactive Solid Waste Processing and Radioactive Material handling, Storage, and Transportation**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
APA-ZZ-01011	Process Control Program	10
HDP-ZZ-09000	Radioactive Material shipping Program	0
HTP-ZZ-02005	Control of RAM inside the RCA	37
HTP-ZZ-09003	Shipment of Radioactive Materials	1
HTP-ZZ-09004	Shipment of Radioactive Wastes	0
RTN-HC-01000	Storage and Handling of Radwaste	18

AUDITS, SELF-ASSESSMENTS, AND SURVEILLANCES

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
AP10-008	Nuclear Oversight Audit of Environmental Monitoring	September 23, 2010

ACTION REQUESTS

200905595	200910397	201000698	201008424	201009085
201100444	201102565			

RADIOACTIVE MATERIAL SHIPMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
2009-0030	Low Specific Activity -II	August 27, 2009
2010-012	Type A	April 16, 2010
2010-020	Low Specific Activity-I	May 10, 2010
2010-026	Low Specific Activity -I	May 21, 2010
2010-032	Low Specific Activity-II	June 15, 2010
2010-038	Low Specific Activity-II	October 15, 2010

**40A1: Performance Indicator Verification**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
EIP-ZZ-00101	Classification of Emergencies	47
EIP-ZZ-00201	Notifications	47
EIP-ZZ-00201A	Control Room Notification Flowchart	11
EIP-ZZ-00201C	EOF Notification Package	11
EIP-ZZ-00212	Protective Action Recommendations	23

CALLAWAY ACTION REQUESTS

201004052	201005083	201100071	201101042
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MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
NEI 99-02	Regulatory Assessment Performance Indicator Guideline	6
	Callaway Plant Mitigating System Performance Index (MSPI) Basis Document	4
	Callaway Plant Emergency Plan	38

**Section 40A2: Identification and Resolution of Problems**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
APA-ZZ-00330	Preventive Maintenance Program	29

DRAWINGS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
M-22EM01(Q)	Piping and Instrumentation Diagram High Pressure Coolant Injection System	36
M-22EP01(Q)	Piping and Instrumentation Diagram Accumulator Safety Injection	17
M-23EM01(Q)	Piping Isometric High Pressure Coolant Injections System – Aux Bldg	11
M-23EM06(Q)	Small Piping Isometric High Pressure Coolant Injection System – Aux Bldg	5

CALLAWAY ACTION REQUESTS

201003871	201004905	201006714	201008617	201009338
201009629	201010442	201011150	201100654	201101431
201102223	201102239	201103302	201104102	201104266
201104149				

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
RFR 04909B	Operability of EGHV0071	December 21, 1989
	Callaway Quarterly Trend Report, First Quarter 2011	May 31, 2011

JOBS

10003078	11002727	11504519	11502994	11501834
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**Section 40A3: Event Follow-up (71153)**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
ISF-SB-00A29	SSPS TRN A Functional Test	29
OTO-BG-00004	VCT Level Channel Failures	15

CALLAWAY ACTION REQUESTS

201104451

**Section 40A5: Other Activities**

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
2011-01	NRC Bulletin 2011-01: Mitigating Strategies	0

**Section 40A7: Licensee-Identified Violations**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>
OSP-SA-00003	ECCS Flowpath Verification and Venting

CALLAWAY ACTION REQUESTS

201004905	201104102
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MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION / DATE</u>
AUCA 11-035	Gas Void found near EMV0250 during ECCS Monthly Venting Surveillance	May 17, 2011
R-4152-00-1	Calculation for allowable voiding at EMV0250	1