UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BLVD
ARLINGTON, TEXAS 76011-4511

February 7, 2012

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

Subject: CALLAWAY PLANT - NRC INTEGRATED INSPECTION REPORT NUMBER 05000483/2011005

Dear Mr. Heflin:

On December 31, 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 January 3, 2012, with Mr. F. Diya, Vice President Nuclear Operations, and other members of your staff.

The inspection 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.

Four NRC-identified and three self-revealing findings of very low safety significance were identified during this inspection. Six of these findings were determined to involve violations of NRC requirements. Further, licensee-identified violations which were determined to be of very low safety significance are listed in this report. The NRC is treating these violations as non-cited violations, consistent with Section 2.3.2 of the NRC Enforcement Policy.

If you contest these non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region IV, 1600 East Lamar Boulevard, Arlington, Texas 76011-4511; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Callaway Plant. If you disagree with a cross-cutting aspect assignment in this report, you should provide 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 enclosures, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of

NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Neil O'Keefe, Chief
Project Branch B
Division of Reactor Projects

Docket: 05000483
License: NPF-30

Enclosures:
NRC Inspection Report 05000483/2011005
w/Attachments: Supplemental Information
Occupational Radiation Safety Inspection Request for Information

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SUNSI Rev Compl.	☑ Yes ☐ No	ADAMS	☑ Yes ☐ No	Reviewer Initials	NFO
Publicly Avail	☑ Yes ☐ No	Sensitive	☐ Yes ☑ No	Sens. Type Initials	NFO

SRI:DRP/	RI:DRP	SPE:DRP	C:DRS/EB1	C:DRS/EB2
DDumbacher	ZHollcraft	LWilloughby	TRFarnholtz	GMiller
/LW via E/	***/LW via E/***	***/RA/***	***/RA/***	***/SGraves for/***
1/30/12	1/31/12	1/30/12	1/31/12	2/1/12
C:DRS/OB	C:DRS/PSB1	C:DRS/PSB2	AC:DRS/TSB	BC:DRP/B
MSHaire	MHay	GEWerner	RAlexander	NO'Keefe
/SGarchow for/	***/RA/***	***/JDrake for/***	***/DPowers for/***	***/RA/***
1/31/12	1/31/12	2/1/12	1/31/12	2/7/12

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000483
License:	NPF-30
Report:	05000483/2011005
Licensee:	Union Electric Company
Facility:	Callaway Plant
Location:	Junction Highway CC and Highway O
Dates:	September 24 through December 31, 2011
Inspectors:	D. Dumbacher, Senior Resident Inspector Z. Hollcraft, Resident Inspector C. Alldredge, Health Physicist G. Apgar, Operations Engineer K. Clayton, Senior Operations Engineer A. Fairbanks, Reactor Inspector S. Hedger, Operations Engineer C. Long, Senior Resident Inspector D. Reinert, Reactor Inspector L. Ricketson, Senior Health Physicist L. Willoughby, Senior Project Engineer
Accompanied By:	T. Buchanan, Operations Engineer
Approved By:	N. O'Keefe, Chief, Project Branch B Division of Reactor Projects

CONTENTS

SUMMARY OF FINDINGS

IR 05000483/2011005, 09/24/2011 - 12/31/2011; Callaway Plant; Integrated Resident and Regional Report; Inservice Inspection Activities, Licensed Operator Requalification, Maintenance Risk Assessments and Emergent Work Control, Postmaintenance Testing 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. Six Green non-cited violations and one Green finding 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. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion V, for the failure to have procedures that ensured that hand files and wire brushes designated for stainless steel weld preparation were stored separately from hand files and wire brushes used on carbon steel. The licensee took corrective actions to remove the stainless steel designations from stainless steel tools that were mixed with tools used on carbon steel, established segregated locations in tool rooms for the separation of abrasive tools, and trained tool room attendants to properly store and mark abrasive tools designated for use on stainless steel. This issue was entered into the licensee's corrective action program as Callaway Action Request 201108921.

  Inspectors determined that the failure to assure that hand files and wire brushes designated for exclusive use on stainless steel were stored separately from tools used on other materials was a performance deficiency. This finding was more than minor because it was associated with the equipment performance attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and, if left uncorrected, could become a more significant safety concern. Inspectors performed a Phase 1 screening in accordance with Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," and determined that the finding was of very low safety significance because the issue would not result in exceeding the technical specification limit for identified reactor coolant system leakage or affect other mitigating systems resulting in a total loss of their safety function. This finding has a cross-cutting aspect in the area of problem identification and resolution, associated with the corrective action program, because the licensee did not thoroughly evaluate

problems such that the resolutions addressed causes and extent of conditions, as necessary. Specifically, the licensee's response to Callaway Action Request 201107806 identified contaminated tools as the cause of rusting on the motor-driven auxiliary feed pump room cooler stainless steel piping, but the licensee took no further action to identify the cause of the contamination [P.1(c)]. (Section 1R08)

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation of 10 CFR Part 55.46(c), "Plant-Referenced Simulators," for failure of the licensee to ensure that the plant-referenced simulator demonstrated expected plant response to transient and accident conditions to which the simulator has been designed to respond. Specifically, the licensee failed to ensure simulator modeling of power-operated relief valve and pressurizer safety valve operation was consistent with the actual plant, introducing the potential for negative operator training. Due to errors made in modeling updates after steam generator replacement in 2005, each pressurizer safety valve was sized in the simulator to allow approximately 3.3 times higher than the design flow rate in the actual plant, and each power operated relief valve was sized to allow approximately 3.5 times higher than the design flow rate capacity provided in the actual plant. The licensee documented their corrective actions for this issue in Callaway Action Request 201101255.

  The failure of the licensee's simulator staff to ensure that the plant-referenced simulator demonstrated expected plant response to transient and accident conditions for which the simulator has been designed to respond was a performance deficiency. The performance deficiency is more than minor because it adversely impacted the human performance attribute of the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, if left uncorrected, the performance deficiency could have become more significant in that training on related accident scenarios could have a negative impact on how licensed operators would respond to an actual event in the control room. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheets, and the corresponding Appendix I, "Licensed Operator Requalification Significance Determination Process," the finding was determined to have very low safety significance (Green) because there was no actual event at the plant similar to the simulator scenario where inappropriate actions were taken in the control room based on training with incorrectly sized components in the simulator. This finding has no cross-cutting aspect assigned because the cause was not representative of current licensee performance. (Section 1R11.2.b.1)

- Green. The inspectors identified a finding associated with the conduct of simulator performance testing because the licensee was not testing in accordance with the standards of ANSI/ANS 3.5-1998. Specifically, the licensee did not include relief valve flow in their 2010 test of transient (10) of

ANSI/ANS 3.5-1998, Appendix B, Section B3.2.1, "Slow Primary System Depressurization to Saturated Condition with Pressurizer Relief or Safety Valve Stuck Open." The licensee initiated corrective action documented in Callaway Action Request 201107912.

Conducting simulator performance testing that was not in accordance with the ANSI/ANS 3.5-1998 standard was a performance deficiency. The performance deficiency is more than minor because it adversely impacted the human performance attribute of the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, if left uncorrected, the performance deficiency could have become more significant in that not completing the required simulator testing annually can lead to not detecting and correcting errors in the simulator so that it models the actual plant correctly. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheets, and the corresponding Appendix I, "Licensed Operator Requalification Significance Determination Process," the finding was determined to have very low safety significance (green) because there was no actual event caused by not modeling the actual plant correctly. This finding has no cross-cutting aspect assigned because the cause was not representative of current licensee performance. (Section 1R11.2.b.2)

- Green. The inspectors identified a non-cited violation of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," involving the licensee's failure to assess and manage outage risk related to significant switchyard work. Specifically, the licensee allowed risk significant relay test work to result in loss of one of two offsite safety related 4 kV power feeds to the plant during Refueling Outage 18. With Callaway Plant in Mode 6, "Refueling," the risk assessment for October 21, 2011, and the Outage Shutdown Management Plan prohibited significant switchyard work. However, at 1:21 p.m., emergency diesel generator A bus NB01 became deenergized due to improper switchyard testing. Callaway Action Request 201108888 was initiated to develop corrective actions.

  Failure to properly assess and manage the risk of significant switchyard work during a high decay heat condition was a performance deficiency. This finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The offsite power system was affected by this event. Using Manual Chapter 0609, Appendix G, Attachment 1, Checklist 4 – "PWR Refueling Operation: RCS level > 23' OR PWR Shutdown Operation with Time to Boil > 2 hours And Inventory in the Pressurizer," this finding was determined to be of very low safety significance because it did not increase the likelihood of a loss of reactor coolant system inventory, did not degrade the ability to terminate a leak path or add reactor coolant system inventory when needed, and did not degrade

the ability to recover decay heat removal, if lost. This finding has a cross-cutting aspect in the area of human performance associated with the resources component because Procedure EDP-ZZ-01129, "Callaway Plant Risk Assessment," Attachment 6, Step 6.c, was not sufficiently complete and accurate to define significant switchyard work [H.2(c)]. (Section 1R13)

- Green. The inspectors reviewed a Green self-revealing non-cited violation of 10 CFR Part 50 Appendix B, Criterion V, "Procedures," involving the licensee's failure to correctly install a ground test device for the train A safety-related 4160 volt switchgear, NB01. During maintenance on the train A safety related bus, workers improperly placed a ground test device with 2000 ampere stab adapters into the 1200 ampere breaker cubicle (for the residual heat removal pump). This damaged the switchgear connection point and caused the breaker to fail, rendering the pump inoperable. The reactor was defueled so the residual heat removal system was not required by technical specifications at the time, but the bus was required to be removed from service for repairs. The licensee repaired the bus connection point, and the pump was retested satisfactorily. This finding was entered into the licensee's corrective action program as Callaway Action Request 201109122.

  Failure to install the correctly configured ground and test device into the NB0101 cubicle of the NB01 switchgear was a performance deficiency. This is more than minor because it is associated with the human performance attribute of the Mitigating Systems Cornerstone and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, improper maintenance caused the residual heat removal pump to become unavailable. Because no fuel was in the vessel at the time of the event, the inspectors referred the issue to a Region IV senior reactor analyst for the significance determination. The analyst used NRC Inspection Manual 0609, Appendix G, "Shutdown Operations Significance Determination Process," to evaluate the significance of the finding. Since all of the fuel had been removed from the vessel there was no potential for core damage (the delta core damage frequency was zero). Therefore, the finding is of very low safety significance (Green). The finding has a cross-cutting aspect in the area of human performance associated with the resources component in that the licensee failed to ensure training of maintenance personnel was adequate to assure nuclear safety [H.2(b)]. (Section 1R19)

- Green. The inspectors reviewed a Green self-revealing non-cited violation of Technical Specification 5.4.1.a, "Procedures," involving the failure to isolate an electrical power supply during maintenance on control room air conditioning system train A. Specifically, while removing an electrical cabinet for maintenance, workers discovered an energized lead that was supposed to have been isolated for the work. Workers failed to stop work and make appropriate notifications. As a result, when the lead was reterminated, it grounded the bus and caused inverter NN11 to shift to an alternate power supply. This caused

operators to make an unplanned entry into a 24-hour shutdown technical specification action statement. The licensee restored normal power to inverter NN11 within 4 hours. This issue was entered into the corrective action program as Callaway Action Request 201107612.

Failure to stop work when a lockout tagout isolation was discovered to be inadequate was a performance deficiency. This finding is more than minor because it is associated with the configuration control attribute of the Mitigating Systems Cornerstone and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, inverter NN11 was rendered less reliable by the improper maintenance. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding was determined to be of very low safety significance because it did not create a loss of system safety function of a single train for greater than the technical specification allowed outage times, and did not affect seismic, flooding, or severe weather initiating events. This finding has a cross-cutting aspect in the area of human performance associated with the work practices component because licensee personnel failed to stop in the face of uncertainty or unexpected circumstances [H.4(a)]. (Section 4OA3.1)

- Green. The inspectors reviewed a self-revealing non-cited violation of Technical Specification 5.4.1.a, "Procedures," involving the failure to ensure compliance with relay test maintenance procedures associated with electrical switchyard work that affected the performance of safety related equipment. On October 21, 2011, Callaway Plant was in Mode 6 with switchyard activities in progress to test transfer trip and lockout relay devices. At 1:21 p.m. the control room operators received several annunciators indicating that diesel generator bus A and its safety related loads had become deenergized. An improperly operated lockout relay had cascaded a test signal onto other components in the plant electrical system. This issue was entered into the corrective action program as Callaway Action Request 201108691.

  Failure to establish the safe working conditions per the transfer trip procedure and failure to operate the lockout relay in the manner specified by the lockout relay procedure were performance deficiencies. This finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, one of the two offsite power feeds to the plant was lost. Using Manual Chapter 0609 Appendix G Attachment 1, Checklist 4 – "PWR Refueling Operation: RCS level > 23' OR PWR Shutdown Operation with Time to Boil > 2 hours And Inventory in the Pressurizer," this finding was determined to be of very low safety significance because it did not increase the likelihood of a loss of reactor coolant system inventory, did not degrade the ability to terminate a leak path or add reactor coolant system inventory when needed, and did not degrade the ability to recover

decay heat removal. This finding has a cross-cutting aspect in the area of human performance associated with the work controls component because the electrical relay test technicians, onsite engineering, and work control staff failed to adequately maintain interfaces to communicate and safely coordinate significant switchyard activities to ensure proper human performance [H.3(b)]. (Section 4OA3.2)

B. Licensee-Identified Violations

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

REPORT DETAILS

Summary of Plant Status

Callaway Plant began the inspection period at full power. On October 15, 2011, the licensee shut the plant down to start Refueling Outage 18. The plant was returned to full power on November 30, 2011. Callaway operated at full power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors performed a review of the adverse weather procedures for seasonal extremes (e.g., extreme low temperatures). The inspectors verified that weather-related equipment deficiencies identified during the previous year were corrected prior to the onset of seasonal extremes, and evaluated the implementation of the adverse weather preparation procedures and compensatory measures for the affected conditions before the onset of, and during, the adverse weather conditions.

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. Specific documents reviewed during this inspection are listed in the attachment. The inspectors also reviewed corrective action program items to verify that plant personnel were identifying adverse weather issues at an appropriate threshold and entering them into their corrective action program in accordance with station corrective action procedures. The inspectors' reviews focused specifically on the following plant systems:

- October 24, 2011, cold weather walkdown of essential service water, refueling water storage tank, condensate storage tank, and various building penetrations

This activity constitutes completion of one readiness for seasonal adverse weather sample as defined in Inspection Procedure 71111.01-05.

b. Findings

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:

- October 6, 2011, emergency core cooling systems (charging and safety injection) alignment for cold overpressure mitigation when reactor coolant system was less than 275 degrees Fahrenheit
- October 21, 2011, containment equipment hatch motor emergency power portable diesel
- November 20, 2011, emergency core cooling system injection lineup prior to entering Mode 3
- November 22, 2011, auxiliary feedwater train A lineup following Mode 4 testing

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 October 16, 2011, the inspectors performed a complete system alignment inspection of the essential service water system following startup after essential safety features actuation sequence testing to verify the functional capability of the system. The inspectors selected this system because it was considered safety 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:

- October 13, 2011, reactor building prior to Refueling Outage 18 shutdown, fire area RB
- November 19, 2011, reactor building during transition to Mode 4, fire area RB
- November 20, 2011, control building 1974 foot essential service water pipe space, Room 3101, fire area C-1
- December 2, 2011, essential service water pump rooms, trains A and B, rooms U104 and U105, fire areas UNPH and USPH

- December 9, 2011, diesel generator room train B, room 5201, fire area D-2

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

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.

- October 7 and 10, 2011, inspection of underground cable vaults for the essential service water system

These activities constitute completion of one bunker/manhole sample as defined in Inspection Procedure 71111.06-05.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

The inspectors reviewed licensee programs, verified performance against industry standards, and reviewed critical operating parameters and maintenance records for the October 15, 2011, component cooling water train B heat exchanger thermal performance test. The inspectors verified that the performance test was satisfactorily conducted and reviewed for problems or errors; the licensee utilized the periodic maintenance method outlined in EPRI Report NP 7552, “Heat Exchanger Performance Monitoring Guidelines,” the licensee properly utilized biofouling controls; the licensee’s heat exchanger inspections adequately assessed the state of cleanliness of their tubes; and the heat exchanger was correctly categorized under 10 CFR 50.65, “Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants.” Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one heat sink inspection sample as defined in Inspection Procedure 71111.07-05.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08)

.1 Inspection Activities Other Than Steam Generator Tube Inspection, Pressurized Water Reactor Vessel Upper Head Penetration Inspections, and Boric Acid Corrosion Control (71111.08-02.01)

a. Inspection Scope

The inspectors observed six nondestructive examination activities and reviewed two nondestructive examination activities that included three types of examinations. The licensee did not identify any relevant indications accepted for continued service during the nondestructive examinations.

The inspectors directly observed the following nondestructive examinations:

SYSTEM	WELD IDENTIFICATION	EXAMINATION TYPE
Chemical and Volume Control	2-BG-02-S056-A 4 inch Straight Tee to 4 inch Pipe	Ultrasonic
Residual Heat Removal	2-EJ-02-C018-IWA Piping Support	Dye Penetrant

SYSTEM	WELD IDENTIFICATION	EXAMINATION TYPE
High Pressure Coolant Injection	Snubber EM01R024112A	Visual
High Pressure Coolant Injection	Snubber EM01R021112A	Visual
High Pressure Coolant Injection	Snubber EM01R027112A	Visual
High Pressure Coolant Injection	Snubber EM01R026112B	Visual

The inspectors reviewed records for the following nondestructive examinations:

SYSTEM	WELD IDENTIFICATION	EXAMINATION TYPE
Reactor Coolant	2-BB-01-S401-10 3 inch Nozzle to 3 inch x 1.5 inch Reducer	Ultrasonic
Reactor Coolant	2-BB-01-S201-15 3 inch Nozzle to 3 inch x 1.5 inch Reducer	Ultrasonic

During the review and observation of each examination, the inspectors verified that activities were performed in accordance with the ASME Code requirements and applicable procedures. The inspectors also verified the qualifications of all nondestructive examination technicians performing the inspections were current.

The inspectors directly observed a portion of the following welding activity:

SYSTEM	WELD IDENTIFICATION	WELD TYPE
Main Feedwater	07010303-500	Shielded Metal Arc Welding

The inspectors reviewed records for the following welding activity:

SYSTEM	WELD IDENTIFICATION	WELD TYPE
Chemical and Volume Control	08007500-500	Shielded Metal Arc Welding

The inspectors verified, by review, that the welding procedure specifications and the welders had been properly qualified in accordance with ASME Code, Section IX, requirements. The inspectors also verified, through observation and record review, that essential variables for the welding process were identified, recorded in the procedure

qualification record, and formed the bases for qualification of the welding procedure specifications. Specific documents reviewed during this inspection are listed in the attachment.

These actions constitute completion of the requirements for Section 02.01.

b. Findings

Introduction. Inspectors identified a Green, non-cited violation of 10 CFR 50, Appendix B, Criterion V, for the failure to have procedures that ensured that hand files and wire brushes designated for stainless steel weld preparation were stored separately from hand files and wire brushes used on carbon steel.

Description. During inspection of the auxiliary building tool room in the radiologically controlled area, inspectors identified that hand files and wire brushes designated for either stainless steel or carbon steel weld preparation were not stored separately. Additionally, inspectors noted that although one hand file was marked for use on stainless steel, the file was rusty and, therefore, most likely was used on carbon steel. Inspectors were concerned that the failure to separate tools used for stainless steel weld preparation from tools used for carbon steel preparation could result in the contamination of stainless steel welds by carbon steel and affect the material integrity and corrosion resistance of these welds.

Inspectors reviewed Procedure APA-ZZ-00660, “Control of Special Processes and System Cleanliness,” Revision 12, and concluded that the procedure was inadequate to ensure the segregation of abrasive tools designated for use on stainless steel from tools used on carbon steel. Step 4.4.4 stated, “Tools marked for use only on stainless steel are stored in a designated location in the Maintenance Tool Room.” Inspectors determined that this statement in the procedure did not provide adequate instruction to personnel to maintain abrasive tools for use on stainless steel separate from abrasive tools meant for use on other materials. Additionally, Step 4.4.5, stated, “Tools marked for use on stainless steel and which inadvertently are used on carbon steel shall have their markings removed or permanently covered and then transferred to the General Tool Storage for general use.” Inspectors concluded that the licensee had not removed the stainless steel markings from the file that appeared to have been used on carbon steel.

The licensee investigated the inspectors’ concerns and concluded that the storage of files and wire brushes designated for use only on stainless steel in the auxiliary building tool room was not meeting the expectations established in Procedure APA-ZZ-00660. In particular, there was no segregation of files or wire brushes and there were files designated for use on stainless steel that were rusty and may have been used on carbon steel. The licensee took immediate action to remove the stainless steel designations from tools used on stainless steel that were mixed with tools used on carbon steel. Additionally, the licensee planned to set up segregated locations in tool rooms for the separation of abrasive tools that are designated for use on stainless steel from those used on other materials. The licensee also planned to reinforce the standards to the tool room attendants to properly store and mark abrasive tools designated for use on

stainless steel and to question the requester of abrasive tools for the end use location so the appropriate tool could be provided.

The inspectors also reviewed documentation from one instance in which contaminated wire brushes had contributed to corrosion on stainless steel piping. Callaway Action Request 201107806, dated September 29, 2011, was written to address questions from the NRC resident inspectors regarding whether rust on stainless steel room cooler piping in the motor-driven auxiliary feedwater pump rooms could cause degradation to the piping. The licensee walked down the room cooler piping and stated that the rust was believed to have been caused by using contaminated stainless steel brushes. In other words, cross-contamination from a tool that had been used to do work on carbon steel had then been used on the stainless steel piping. The licensee concluded that the rust was superficial and would not induce any degradation.

This issue was entered into the licensee's corrective action program as Callaway Action Request 201108921.

Analysis. Inspectors determined that the failure to assure that hand files and wire brushes designated for exclusive use on stainless steel were stored separately from tools used on other materials was a performance deficiency. This finding was more than minor because it was associated with the equipment performance attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and, if left uncorrected, would become a more significant safety concern. Inspectors performed a Phase 1 screening in accordance with Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," and determined that the finding was of very low safety significance (Green) because the issue did not result in exceeding the technical specification limit for identified reactor coolant system leakage or affect other mitigating systems resulting in a total loss of their safety function. This finding has a cross-cutting aspect in the area of problem identification and resolution, associated with the corrective action program, because the licensee did not thoroughly evaluate problems such that the resolutions addressed causes and extent of conditions, as necessary. Specifically, the licensee's response to Callaway Action Request 201107806 identified contaminated tools as the cause of rusting on the motor-driven auxiliary feed pump room cooler stainless steel piping, but the licensee took no further action to identify the cause of the contamination [P.1(c)].

Enforcement. Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion V, states, in part, "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." The control of tools used on stainless steel was an activity affecting quality, and was implemented by Procedure APA-ZZ-00660, "Control of Special Processes and System Cleanliness," Revision 12. Steps 4.4.4 and 4.4.5 required, in part, that tools marked for use only on stainless steel be stored in a designated location and tools designated for use on stainless steel have the markings removed if used on carbon steel. Contrary to the above, prior to October 25, 2011, the licensee failed to prescribe and accomplish the

separation and appropriate designation of tools used on stainless steel. This issue was entered into the licensee's corrective action program as Callaway Action Request 201108921. Because this finding was determined to be of very low safety significance and was entered into the license's corrective action program, this violation is being treated as a non-cited violation consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000483/2011005-01, "Failure to Ensure Separation of Stainless Steel and Carbon Steel Hand Files and Wire Brushes."

.2 Vessel Upper Head Penetration Inspection Activities (71111.08-02.02)

a. Inspection Scope

The inspectors reviewed the results of the licensee's bare metal visual inspection of the reactor vessel upper head penetrations and verified that there was no evidence of boric acid challenging the structural integrity of the reactor head components and attachments. The inspectors also verified that the required inspection coverage was achieved and limitations were properly recorded. The inspectors verified that the personnel performing the inspection were certified examiners of their respective nondestructive examination method. Specific documents reviewed during this inspection are listed in the attachment.

These actions constitute completion of the requirements for Section 02.02.

b. Findings

No findings were identified.

.3 Boric Acid Corrosion Control Inspection Activities (71111.08-02.03)

a. Inspection Scope

The inspectors evaluated the implementation of the licensee's boric acid corrosion control program for monitoring degradation of those systems that could be adversely affected by boric acid corrosion. The inspectors reviewed the documentation associated with the licensee's boric acid corrosion control walkdown as specified in Procedure QCP-ZZ-0548, "Boric Acid Walkdown for Reactor Coolant System Pressure Boundary," Revision 7. The inspectors also reviewed the visual records of the components and equipment. The inspectors verified that the visual inspections emphasized locations where boric acid leaks could cause degradation of safety-significant components. The inspectors also verified that the engineering evaluations for those components where boric acid was identified gave assurance that the ASME Code wall thickness limits were properly maintained. The inspectors confirmed that the corrective actions performed for evidence of boric acid leaks were consistent with requirements of the ASME Code. Specific documents reviewed during this inspection are listed in the attachment.

These actions constitute completion of the requirements for Section 02.03.

b. Findings

No findings were identified.

.4 Steam Generator Tube Inspection Activities (71111.08-02.04)

a. Inspection Scope

The inspection procedure specified performance of an assessment of in situ screening criteria to assure consistency between assumed nondestructive examination flaw sizing accuracy and data from the Electric Power Research Institute (EPRI) examination technique specification sheets. It further specified assessment of appropriateness of tubes selected for in situ pressure testing, observation of in situ pressure testing, and review of in situ pressure test results. No conditions had been identified that warranted in situ pressure testing.

The inspection procedure specified confirmation that the steam generator tube eddy current test scope and expansion criteria meet Technical Specification requirements, EPRI guidelines, and commitments made to the NRC. The inspectors evaluated the recommended steam generator tube eddy current test scope established by Technical Specification requirements. The inspectors compared the recommended test scope to the actual test scope and found that the licensee had accounted for all known flaws and had, as a minimum, established a test scope that met Technical Specification requirements, EPRI guidelines, and commitments made to the NRC. The scope of the licensee's eddy current examinations of tubes in all four steam generators included:

- 100 percent eddy current bobbin probe examinations, full length tube end to tube end

- Eddy current X-probe examinations of the outer three rows of tubesheet periphery and no-tube lanes

- X-probe or rotating coil examinations of any tubes with potential loose parts indications

- Special interest +Point probe diagnostic examinations including anti-vibration bar wear, bobbin probe non-quantifiable indications, and 20 percent of bobbin probe ding indications

The inspection procedure required confirmation that the licensee inspected all areas of potential degradation, especially areas that were known to represent potential eddy current test challenges such as the top-of-tubesheet, tube support plates, and U-bends. The inspectors confirmed that all known areas of potential degradation were included in the scope of inspection and were being inspected.

No new degradation mechanisms were identified during the inspection. The only indications of degradation detected during the eddy current inspections were small wear

indications at the anti-vibration bar intersections. The licensee plugged any tubes with wear indications of 28 percent or greater. The licensee plugged a total of 29 tubes with anti-vibration bar wear indications. No indications of loose parts or loose part wear were detected from either the top of tubesheet +Point inspections or the visual inspections of the top of the tubesheet.

The licensee performed inspections of secondary side components including the steam drums and loose parts trapping system, and performed a foreign material search and retrieval. If loose parts or foreign material on the secondary side were identified, the inspection procedure specified confirmation that the licensee had taken or planned appropriate repairs of affected steam generator tubes and that they inspected the secondary side to either remove the accessible foreign objects or perform an evaluation of the potential effects of inaccessible object migration and tube fretting damage. At the time of the inspection, no foreign material had been identified.

Finally, the inspection procedure specified review of one to five samples of eddy current test data if questions arose regarding the adequacy of eddy current test data analyses. The inspectors did not identify any results where eddy current test data analyses were inadequate.

These actions constitute completion of the requirements of Section 02.04.

b. Findings

No findings were identified.

.5 Identification and Resolution of Problems (71111.08-02.05)

a. Inspection scope

The inspectors reviewed 20 Callaway action requests which dealt with inservice inspection activities and found the corrective actions for inservice inspection issues were appropriate. The specific Callaway action requests reviewed are listed in the documents reviewed section. From this review the inspectors concluded that the licensee has an appropriate threshold for entering inservice inspection issues into the corrective action program and has procedures that direct a root cause evaluation when necessary. The licensee also had an effective program for applying industry inservice inspection operating experience. Specific documents reviewed during this inspection are listed in the attachment.

These actions constitute completion of the requirements of Section 02.05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11 and 71111.11B)

.1 Quarterly Review

a. Inspection Scope

On November 29, 2011, the inspectors observed a crew 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 one quarterly licensed-operator requalification program sample as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

.2 Biennial Inspection

The licensed operator requalification program involves two training cycles that are conducted over a 2-year period. In the first cycle, the annual cycle, the operators are administered an operating test consisting of job performance measures and simulator scenarios. In the second part of the training cycle, the biennial cycle, operators are administered an operating test and a comprehensive written examination.

a. Inspection Scope

To assess the performance effectiveness of the licensed operator requalification program, the inspectors conducted personnel interviews, reviewed both the operating tests and written examinations, and observed ongoing operating test activities.

The inspectors interviewed six licensee personnel, including operators, instructors/evaluators, and training supervisors, to determine their understanding of the policies and practices for administering requalification examinations. The inspectors also reviewed operator performance on the written exams and operating tests. These reviews included observations of portions of the operating tests by the inspectors. The operating tests observed included six job performance measures (JPMs) and two dynamic simulator scenarios that were used in the current biennial requalification cycle. These observations allowed the inspectors to assess the licensee's effectiveness in conducting the operating test to ensure operator mastery of the training program content. The inspectors also reviewed medical records of nine licensed operators for conformance to license conditions and the licensee’s system for tracking qualifications and records of license reactivation for four operators.

The results of these examinations were reviewed to determine the effectiveness of the licensee’s appraisal of operator performance and to determine if feedback of performance analyses into the requalification training program was being accomplished. The inspectors interviewed members of the training department and reviewed minutes of training review group meetings to assess the responsiveness of the licensed operator requalification program to incorporate the lessons learned from both plant and industry events. Examination results were also assessed to determine if they were consistent with the guidance contained in NUREG 1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1, and NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process."

In addition to the above, the inspectors reviewed examination security measures, simulator fidelity, and existing logs of simulator deficiencies.

The inspectors completed one inspection sample of the biennial licensed operator requalification program.

b. Findings

1. Introduction. The inspectors identified a Green non-cited violation of 10 CFR Part 55.46(c), “Plant-Referenced Simulators,” for the failure of the licensee to ensure that the plant-referenced simulator demonstrated expected plant response to transient and accident conditions to which the simulator has been designed to respond. Specifically, the licensee failed to ensure that simulator modeling of power-operated relief valve operation was consistent with the actual plant, introducing the potential for negative operator training.

Description. During the January 2011 NRC initial licensed operator exam, NRC examiners observed that during a simulated full anticipated transient without scram with a loss of offsite power, relief of high reactor coolant system pressure through power operated relief valves and pressurizer safety valves lowered pressure enough to cause a safety injection actuation. The safety injection actuation signal setpoints are established to protect the reactor coolant system during loss of coolant accidents and steam line break events. Since the simulated anticipated transient without scram with loss of offsite power event should not have caused a safety injection actuation, NRC examiners questioned the licensee as to why this safety injection actuation occurred in the simulator for this circumstance. Licensee staff informed NRC examiners that this occurrence in the simulator was seen as normal, but continued to investigate it further. Testing of the simulator, detailed in document SIFT # 20110018, Record 7284, revealed that each pressurizer safety valve was sized in the simulator to allow approximately 3.3 times higher than the design flow rate in the actual plant. In addition, each power operated relief valve was sized to allow approximately 3.5 times higher than the design flow rate capacity provided in the actual plant.

Following a steam generator replacement project in November 2005, updates were made to the simulator to account for the various design changes in the plant. The licensee did not identify that changes were made to the plant parameters in question, which introduced the errors into the simulator model.

The licensee documented their corrective actions for this issue in Callaway Action Request 201101255. The sizing of the power-operated relief valves and pressurizer safety valves were corrected in the simulator to match actual design values, and issues with the steam generator condenser steam dump valves were identified by the licensee as part of this testing and subsequently corrected in the simulator.

Analysis. Failure of the licensee's simulator staff to ensure that the plant-referenced simulator demonstrated expected plant response to transient and accident conditions for which the simulator was designed was a performance deficiency. The performance deficiency is more than minor because it adversely impacted the human performance attribute of the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, if left uncorrected, the performance deficiency could have become more significant in that training on related accident scenarios could have a negative impact on how licensed operators would respond to an actual event in the control room. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheets, and the corresponding Appendix I, "Licensed Operator Requalification Significance Determination Process," the finding was determined to have very low safety significance (Green) because there was no actual event at the plant similar to the simulator scenario where inappropriate actions were taken in the control room based on training with incorrectly sized components in the simulator.

This finding has no cross-cutting aspect assigned because the cause was not representative of current licensee performance. The errors were introduced into the simulator model in 2005.

Enforcement. Title 10 of the Code of Federal Regulations Part 55.46(c), "Plant-Referenced Simulators," requires, in part, that plant-referenced simulators demonstrate expected plant response to transient and accident conditions to which the simulators have been designed to respond. Contrary to the above, from November 2005 to January 2011, the licensee failed to ensure that its plant-referenced simulator demonstrated expected plant response to transient and accident conditions to which it has been designed to respond. Specifically, changes made to the simulator as a result of the steam generator replacement project introduced sizing errors for the pressurizer safety valves and power-operated relief valves into the simulator model. This had the potential to cause negative operator training in the simulator. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program as Callaway Action Request 201101255, this violation is being treated as a non-cited violation consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000483/2011005-02, "Failure to Maintain Simulator Fidelity."

2. Introduction. The inspectors identified a Green finding associated with the conduct of simulator performance testing because the licensee was not testing in accordance with the standards of ANSI/ANS 3.5-1998. Specifically, the licensee did not include relief valve flow in their 2010 test of transient (10) of ANSI/ANS 3.5-1998, Appendix B, Section B3.2.1, "Slow Primary System Depressurization to Saturated Condition with Pressurizer Relief or Safety Valve Stuck Open."

Description. In order to maintain an NRC approved simulation facility, the licensee is required to conduct performance testing throughout the life of the simulator to ensure that it can be used to model control manipulations consistent with the actual plant. The licensee committed to conducting this testing by using industry standard ANSI/ANS 3.5, "Nuclear Power Plant Simulators for Use in Operator Training and Examination."

The required annual testing detailed in this standard included transient performance tests, where the licensee conducts simulator tests on eleven specific transients specified in Appendix B, Section B3.2 of the standard. For these transients, it also specified which plant parameters have to be recorded as part of the tests. In 2010, as part of conducting these annual transient performance tests, the licensee conducted a test on transient (10) of ANSI/ANS 3.5-1998, Appendix B, Section B3.2.1, "Slow Primary System Depressurization to Saturated Condition with Pressurizer Relief or Safety Valve Stuck Open." Appendix B, Section B3.2.5 specifically included relief valve flow. This parameter was modeled in the licensee's simulator, but they did not include its measurement as part of their test (per document SIFT 20100001, Test # T2770). The licensee initiated corrective action documented in Callaway Action Request 201107912, which included adding this parameter to the scope of the annual test. Failing to include relief valve flow in the testing data contributed to the facility's failure to identify that they had not modeled the size of power-operated relief valves and pressurizer safety valves correctly.

Analysis. Conducting simulator performance testing that was not in accordance with ANSI/ANS 3.5-1998 was a performance deficiency. The performance deficiency is more than minor because it adversely impacted the human performance attribute of the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and

capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, if left uncorrected, the performance deficiency could have become more significant in that not completing the required simulator testing annually can lead to not detecting and correcting errors in the simulator so that it models the actual plant correctly. In fact, a simulator fidelity issue with relief valve flow was missed by the licensee because of the failure to conduct this testing sufficiently, which had the potential to negatively impact training. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheets, and the corresponding Appendix I, "Licensed Operator Requalification Significance Determination Process," the finding was determined to have very low safety significance (Green) because there was no actual event caused by not modeling the actual plant correctly.

This finding has no cross-cutting aspect assigned because the cause was not representative of current licensee performance. The licensee reviewed their annual testing records and determined the measurement of relief valve flow has not been included in their annual testing for at least 10 years.

Enforcement. No violation of regulatory requirements was identified. Because this finding does not involve a violation and has very low safety significance, it is identified as FIN 05000483/2011005-03: "Failure to Conduct Simulator Testing in Accordance with ANSI/ANS 3.5-1998."

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

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

- Essential service water pump room ventilation damper system, Callaway Action Request 201105700
- Reactor coolant sample system containment isolation valve leakage, Callaway Action Requests 201102158 and 201110163

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 monitoring

- Charging unavailability for performance monitoring
- 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 two 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:

- September 28, 2011, planned risk associated with emergency diesel generator train B supply fan maintenance and surveillance testing of the turbine-driven auxiliary feedwater pump
- October 19, 2011, planned yellow risk due to reactor coolant system level being 6 inches below the reactor vessel head flange while in Mode 6
- October 21, 2011, an unplanned risk condition was revealed when significant switchyard work caused a loss of one train of offsite power
- November 12, 2011, placement/lift of the reactor upper internals

- November 14, 2011, planned yellow risk due to the reactor coolant system level being at reduced inventory with the reactor head installed

- November 21, 2011, risk evaluation for atmospheric steam dump valve ABPV00001 being out of service greater than 7 days as Callaway Plant transitioned from Mode 3 to online. The inspectors reviewed licensee risk document PRAER 11-361.

- November 21, 2011, planned yellow risk associated with taking the turbine-driven auxiliary feedwater pump out of service in Mode 3

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 seven maintenance risk assessments and emergent work control inspection samples as defined in Inspection Procedure 71111.13-05.

b. Findings

Introduction. The inspectors identified a Green violation of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," involving the licensee's failure to manage outage risk related to significant switchyard work. Specifically the licensee allowed risk significant relay test work to result in loss of one of two offsite power feeds to the plant during Refueling Outage 18.

Description. On October 21, 2011, Callaway Plant was in Mode 6, "Refueling," with the reactor head removed. Preparations were being made to remove the reactor vessel upper internals. Emergency diesel generator A was out of service. Switchyard activities to test lockout relay devices were also in progress. Shutdown cooling flow for the reactor coolant system was provided by residual heat removal pump B.

Callaway Procedure EDP-ZZ-01129, "Callaway Plant Risk Assessment," Attachment 6 covered Mode 6 – Refueling Operations greater than 23 feet above the reactor vessel flange. This procedure required that operators and work control personnel evaluate plant risk associated with susceptibility to a loss of offsite power due to personnel errors or equipment failures. The risk assessment for October 21, 2011, and the Outage

Shutdown Management Plan prohibited significant switchyard work during this Mode 6 work window. Step 6.c of Attachment 6 to Procedure EDP-ZZ-01129 defined "risk-significant switchyard work" as any activity that could result in a loss of offsite power to the plant. However, the Refueling Outage 18 Shutdown Management Plan provided two examples of significant switchyard work. One of these examples involved relay testing activities. The risk plan industry operating experience section specifically stated that human errors during switchyard activities have resulted in industry events such as loss of shutdown cooling.

At 1:21 p.m., the control room operators received several annunciators indicating that emergency diesel generator A, bus NB01, had become deenergized and was in a lockout condition. The operators noticed that the electrical feed to the bus through breaker 52-3 from the switchyard safeguards transformer B had opened and that the other bus feeder breakers were also open. The loss of bus NB01 was caused by lockout relay testing when the relay test engineer incorrectly assumed that a proper test setup existed. The inspectors identified that the licensee did not perform the risk management action to prevent significant switchyard work during the mode 6 condition. The inadvertent loss of bus NB01 resulted in a loss of one of the two residual heat removal pumps, but not shutdown cooling flow. Callaway Action Request 201108888 was initiated to develop corrective actions. (See NCV 05000483/2011005-07 in Section 4OA3.)

Analysis. Failure to properly assess and manage the risk of significant switchyard work during a high decay heat condition was a performance deficiency. This finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The offsite power system was rendered less reliable by this event. Using Manual Chapter 0609, Appendix G, Attachment 1, Checklist 4 – "PWR Refueling Operation: RCS level > 23' OR PWR Shutdown Operation with Time to Boil > 2 hours And Inventory in the Pressurizer," this finding was determined to be of very low safety significance because it did not increase the likelihood of a loss of reactor coolant system inventory, did not degrade the ability to terminate a leak path or add reactor coolant system inventory when needed, and did not degrade the ability to recover decay heat removal, if lost. This finding has a cross-cutting aspect in the area of human performance associated with the resources component because Procedure EDP-ZZ-01129, Attachment 6, Step 6.c, was not sufficiently complete and accurate to define significant switchyard work. Specifically, it defined the concept of limiting the likelihood of human performance errors but then implied that switchyard risk was only related to vehicles and cranes in the area [H.2(c)].

Enforcement. Paragraph (a)(4) of 10 CFR 50.65 of the Maintenance Rule requires licensees to assess and manage plant risk related to maintenance activities during all modes of plant operation. Contrary to the above, on October 21, 2011, the licensee failed to adequately assess and manage risk related to switchyard maintenance activities. Callaway Plant procedures covering plant risk controls allowed significant switchyard work to affect the availability of components supporting offsite power and

shutdown cooling. Specifically, because of the inadequacy of Callaway Plant risk Procedure EDP-ZZ-01129, “Callaway Plant Risk Assessment,” Attachment 6, Step 6.c, the licensee did not effectively manage the risk associated with significant switchyard work. This conflict resulted in loss of one of two offsite power feeds and one train of shutdown cooling equipment. Because this finding is of very low safety significance and was entered into the licensee's corrective action program as Callaway Action Request 201108888, this violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000483/2011005-04, “Failure to Adequately Assess and Manage Outage Risk Associated with Significant Switchyard Work.”

1R15 Operability Evaluations and Functionality Assessments (71111.15)

a. Inspection Scope

The inspectors reviewed the following issues:

- October 18, 2011, Callaway Action Request 201108490, degraded containment coating
- November 21, 2011, Callaway Action Request 201109948, centrifugal charging pump A seal leak
- November 23, 2011, Callaway Action Request 201110012, digital rod position indication data cabinet A failure for control rods B10 and B06
- November 23, 2011, Callaway Action Request 201110034, turbine-driven auxiliary feedwater pump packing leak

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 four operability evaluations inspection samples as defined in Inspection Procedure 71111.15-05

b. Findings

No findings were identified.

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 following temporary modification:

- Temporary modification TM 11-0004, installation of thermal performance test equipment for containment cooler SGN01D

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, structural, process medium properties, licensing basis, and failure modes for the permanent modifications listed below.

- Modification MP 10-0003, installation of check valves in normal service water piping to the essential service water system

- Modification MP 10-0004, sequence change for opening essential service water valves

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:

- September 30, 2011, Technical Support Center heating ventilation and air conditioning installation postmaintenance test, Job 11000199
- October 14, 2011, alternate emergency power supply diesel postmaintenance test after changing output breaker relay settings, Job 11004604
- October 26, 2011, postmaintenance testing (blue seat checks) of reactor coolant system and safety injection accumulator check valve repairs (BB8948A and EP8956A), Jobs 07003942 and 10006323
- October 29, 2011, postmaintenance testing of NB01, Job 04503768
- November 21, 2011, postmaintenance testing of valve ALHV10, Job 10513172
- November 19, 2011, postmaintenance testing of valve ALHV07, Job 05517259
- November 20, 2011, postmaintenance testing of centrifugal charging pump A, Job 11006744

- November 22, 2011, postmaintenance testing (pressure test) of reactor coolant system pressure isolation valves, Job 10509409

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 eight postmaintenance testing inspection samples as defined in Inspection Procedure 71111.19-05.

b. Findings

Introduction. The inspectors reviewed a Green self-revealing non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Procedures," involving the licensee's failure to correctly install a ground test device for safety related 4160 volt switchgear, NB01, train A.

Description. On October 29, 2011, with the reactor defueled, plant operators attempted to start residual heat removal pump A as part of the fill and vent procedure for system restoration. When the operator took the control room switch to start, the pump did not start. Workers near the breaker noted that it closed, the springs charged, and then reopened after the operator in the control room secured the pump. The pump was declared inoperable and the evolution was stopped. The licensee's troubleshooting determined that during previous maintenance, workers had improperly placed a ground test device with 2000 ampere stab adapters into 1200 ampere breaker cubicle NB0101 (for the residual heat removal pump). This damaged the switchgear connection points (rosettes) in the cubicle such that when the normal breaker was reinstalled the rosettes would not engage. This resulted in the breaker not energizing the pump when closed. Subsequent investigation revealed that while conducting Maintenance Procedure 04503768/520 (Install Ground Devices in NB01 for Ductor Testing) the workers incorrectly believed that the "01" cubicle of switchgear busses always require a

2000 ampere cubicle. However, safety-related busses NB01 and NB02 have a different numbering scheme and the “01” cubicle is occupied by a different breaker, in this case the 1200 ampere breaker for the residual heat removal pump.

The maintenance procedure that directed workers to setup and install the ground test device was dependent on the worker’s training to know how to use drawings included with the package to properly verify the amperage of the cubicle. The workers instead depended on incorrect system knowledge to determine the amperage. A specific qualification is required to operate and install the ground and test device (T67.2021 Q), however, the qualification standard does not have a specific requirement to demonstrate the ability to determine the proper amperage of a cubicle before installing the device.

As immediate corrective action, the rosettes were replaced and the breaker and pump retested satisfactorily.

Analysis. The performance deficiency associated with this finding was the licensee’s failure to install the correctly configured ground and test device into the NB0101 cubicle of the NB01 switchgear. This finding is more than minor because it is associated with the human performance attribute of the Mitigating Systems Cornerstone and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, improper maintenance caused the “A” train safety-related switchgear to become unavailable. Because no fuel was in the vessel at the time of the event, the inspectors referred the issue to a Region IV senior reactor analyst for the significance determination. The analyst used NRC Inspection Manual 0609, Appendix G, “Shutdown Operations Significance Determination Process,” to evaluate the significance of the finding. Appendix G applies when the residual heat removal entry conditions begin and ends when the licensee exits the residual heat removal operational conditions and heats up the reactor. Appendix G defines a shutdown operation as an operational mode where more than one fuel assembly is in the reactor vessel and the decay heat removal system is in operation. However, all of the fuel had been removed from the vessel. Therefore, there was no potential for core damage (the delta-CDF was zero). This finding is of very low safety significance (Green). It has a cross-cutting aspect in the area of human performance associated with the resources component in that the licensee failed to ensure training of maintenance personnel was adequate to assure nuclear safety [H.2(b)].

Enforcement. Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criteria V, "Procedures," requires 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. Contrary to the above, on October 26, 2011, maintenance workers installing a ground device in the train A switchgear, an activity affecting quality, failed to accomplish this task in accordance with the instructions, procedures, and drawings. Specifically, workers did not use the approved drawings to determine the appropriate amperage of the safety related breaker cubicle and as a result, installed the wrong ground and test device causing damage to the switchgear for residual heat

removal pump A. Because this finding is of very low safety significance and was entered into the licensee's corrective action program as Callaway Action Request 201109122, this violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000483/2011005-05, "Improper Ground and Test Device Damages Residual Heat Removal Pump Switchgear."

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope

The inspectors reviewed the outage safety plan and contingency plans for planned Refueling Outage 18, conducted between October 15 and November 30, 2011, to confirm that licensee personnel had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense in depth. During the refueling outage, the inspectors observed portions of the shutdown and cooldown processes and monitored licensee controls over the outage activities listed below.

- Configuration management, including maintenance of defense in depth, is commensurate with the outage safety plan for key safety functions and compliance with the applicable technical specifications when taking equipment out of service

- Clearance activities, including confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing

- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication, accounting for instrument error

- Status and configuration of electrical systems to ensure that technical specifications and outage safety-plan requirements were met, including controls over switchyard activities (Specifically the October 21, 2011, loss of offsite power feed to bus NB01 was selected for additional event follow-up. See Section 4OA3)

- Monitoring of decay heat removal processes, systems, and components

- Verification that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system

- Reactor water inventory controls, including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss (Specifically the November 1, 2011, loss of steam generator B hot leg drain plug integrity that necessitated draining the reactor cavity to near mid-loop level was selected for additional event follow-up. See Section 4OA3.)

- Controls over activities that could affect reactivity

- Refueling activities, including fuel handling and heavy load lifts associated with reactor vessel assembly/disassembly

- Startup and ascension to full power operation, tracking of startup prerequisites, walkdown of the containment to verify that debris had not been left which could block emergency core cooling system suction strainers, and reactor physics testing

- Licensee identification and resolution of problems related to refueling outage activities

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

These activities constitute completion of one refueling and other outage activity inspection sample as defined in Inspection Procedure 71111.20-05.

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
- Annunciators and alarms setpoints

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

- September 26, 2011, routine surveillance emergency diesel train B 24-hour run with hot restart, Job 10507159
- September 29, 2011, routine surveillance of turbine-driven auxiliary feedwater pump valve, Surveillance OSP-AL-V001C, Job 11508034
- October 13, 2011 in-service test of main steam safety valve lift setpoints
- October 15, 2011, routine surveillance, shutdown margin calculation for Refueling Outage 18
- October 16, 2011, routine surveillance, diesel generator train A and sequencer testing
- November 9, 2011, routine surveillance to test the boron dilution mitigation system response, Job 10507555
- November 16, 2011, in-service test of the reactor vessel head vent valves, Job 10509161
- November 19, 2011, routine surveillance to verify containment closeout for Mode 4, Job 10509175
- November 19, 2011, routine surveillance, containment personnel hatch door and shaft seal leak rate test
- November 19, 2011, in-service test of auxiliary feedwater pump discharge check valves
- November 21, 2011, containment isolation valve surveillance testing associated with Procedure ESP-ZZ- SM01001, containment leakage rate testing program, Job 11513180

- November 22, 2011, in-service test of main feedwater isolation valves, Job 10508187

- November 22, 2011, routine surveillance to maintain reactor coolant system heat-up limitations

- November 23, 2011, routine surveillance to determine the estimated critical position for Refueling Outage 18 startup, Job 10509408

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

These activities constitute completion of a total of fourteen surveillance testing inspection samples, specifically nine routine, one containment isolation valve, and four in-service test surveillances as defined in Inspection Procedure 71111.22-05.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Occupational and Public Radiation Safety

2RS01 Radiological Hazard Assessment and Exposure Controls (71124.01)

a. Inspection Scope

This area was inspected to: (1) review and assess licensee's performance in assessing the radiological hazards in the workplace associated with licensed activities and the implementation of appropriate radiation monitoring and exposure control measures for both individual and collective exposures, (2) verify the licensee is properly identifying and reporting Occupational Radiation Safety Cornerstone performance indicators, and (3) identify those performance deficiencies that were reportable as a performance indicator and which may have represented a substantial potential for overexposure of the worker.

The inspectors used the requirements in 10 CFR Part 20, the technical specifications, and the licensee's procedures required by technical specifications as criteria for determining compliance. During the inspection, the inspectors interviewed the radiation protection manager, radiation protection supervisors, and radiation workers. The inspectors performed walkdowns of various portions of the plant, performed independent radiation dose rate measurements and reviewed the following items:

- Performance indicator events and associated documentation reported by the licensee in the Occupational Radiation Safety Cornerstone

- The hazard assessment program, including a review of the licensee's evaluations of changes in plant operations and radiological surveys to detect dose rates, airborne radioactivity, and surface contamination levels

- Instructions and notices to workers, including labeling or marking containers of radioactive material, radiation work permits, actions for electronic dosimeter alarms, and changes to radiological conditions

- Programs and processes for control of sealed sources and release of potentially contaminated material from the radiologically controlled area, including survey performance, instrument sensitivity, release criteria, procedural guidance, and sealed source accountability

- Radiological hazards control and work coverage, including the adequacy of surveys, radiation protection job coverage, and contamination controls; the use of electronic dosimeters in high noise areas; dosimetry placement; airborne radioactivity monitoring; controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools; and posting and physical controls for high radiation areas and very high radiation areas

- Radiation worker and radiation protection technician performance with respect to radiation protection work requirements

- Audits, self-assessments, and corrective action documents related to radiological hazard assessment and exposure controls 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 71124.01-05.

b. Findings

No findings were identified.

2RS02 Occupational ALARA Planning and Controls (71124.02)

a. Inspection Scope

This area was inspected to assess performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements in 10 CFR Part 20, the technical specifications, and the licensee's procedures required by technical specifications as criteria for determining compliance. During the inspection, the inspectors interviewed licensee personnel and reviewed the following items:

- Site-specific ALARA procedures and collective exposure history, including the current 3-year rolling average, site-specific trends in collective exposures, and source-term measurements

- ALARA work activity evaluations/postjob reviews, exposure estimates, and exposure mitigation requirements

- The methodology for estimating work activity exposures, the intended dose outcome, the accuracy of dose rate and man-hour estimates, and intended versus actual work activity doses and the reasons for any inconsistencies

- Records detailing the historical trends and current status of tracked plant source terms and contingency plans for expected changes in the source term due to changes in plant fuel performance issues or changes in plant primary chemistry

- Radiation worker and radiation protection technician performance during work activities in radiation areas, airborne radioactivity areas, or high radiation areas

- Audits, self-assessments, and corrective action documents related to ALARA planning and controls 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 71124.02-05.

b. <u>Findings</u>

No findings were identified.

4. OTHER ACTIVITIES

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

4OA1 Performance Indicator Verification (71151)

.1 <u>Data Submission Issue</u>

a. <u>Inspection Scope</u>

The inspectors performed a review of the performance indicator data submitted by the licensee for the third 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 Mitigating Systems Performance Index - High Pressure Injection Systems (MS07)

a. Inspection Scope

The inspectors sampled licensee submittals for the mitigating systems performance index - high pressure injection systems performance indicator for the period from the fourth quarter 2010 through the third 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, mitigating systems performance index derivation reports, event reports, and NRC integrated inspection reports for the period of October 2010 through September 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 - high pressure injection system sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index - Residual Heat Removal System (MS09)

a. Inspection Scope

The inspectors sampled licensee submittals for the mitigating systems performance index - residual heat removal system performance indicator for the period from the fourth quarter 2010 through the third 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, mitigating systems performance index derivation reports, event reports, and NRC integrated inspection reports for the period of October 2010 through September 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 - residual heat removal system sample as defined in Inspection Procedure 71151-05.

b. <u>Findings</u>

No findings were identified.

.4 <u>Occupational Exposure Control Effectiveness (OR01)</u>

a. <u>Inspection Scope</u>

The inspectors reviewed performance indicator data for the first quarter 2011 through the third quarter 2011. The objective of the inspection was to determine the accuracy and completeness of the performance indicator data reported during these periods. The inspectors used the definitions and clarifying notes contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, as criteria for determining whether the licensee was in compliance.

The inspectors reviewed corrective action program records associated with high radiation area (greater than 1 rem/hr) and very high radiation area non-conformances. The inspectors reviewed radiological controlled area exit transactions greater than 100 mrem. The inspectors also conducted walkdowns of high radiation areas (greater than 1 rem/hr) and very high radiation area entrances to determine the adequacy of the controls of these areas.

These activities constitute completion of the occupational exposure control effectiveness sample as defined in Inspection Procedure 71151-05.

b. <u>Findings</u>

No findings were identified.

.5 <u>Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences (PR01)</u>

a. <u>Inspection Scope</u>

The inspectors reviewed performance indicator data for the first quarter 2011 through the third quarter 2011. The objective of the inspection was to determine the accuracy and completeness of the performance indicator data reported during these periods. The

inspectors used the definitions and clarifying notes contained in NEI Document 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 6, as criteria for determining whether the licensee was in compliance.

The inspectors reviewed the licensee’s corrective action program records and selected individual annual or special reports to identify potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose.

These activities constitute completion of the radiological effluent technical specifications/offsite dose calculation manual radiological effluent occurrences sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

.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 July 2011 through December 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 201103255, trend in consequential errors in maintenance

- Callaway Action Request 201105601, boric acid corrosion control program health score is declining

- Callaway Action Request 201107725, adverse trend in security human performance

- Callaway Action Requests 201110229, 201110462, and 201110566, safety injection accumulator A leakage to fill lines causing potential void concerns

- Callaway Action Request 201110817, licensee personnel fitness-for-duty work-hour violations

The resident inspectors concurred with these items as being noteworthy trends needing additional corrective actions.

An additional inspector-identified adverse trend was:

- Callaway Action Requests 201109569 and 201110526, unanalyzed fire barriers associated with essential service water piping features (specifically the high density polyethelene piping entering room 3101 and the rubber expansion joints in the essential service water piping to the emergency diesels were unanalyzed fire barriers)

The licensee has entered these issues into their corrective action program.

.4 Selected Issue Follow-up Inspection

a. Inspection Scope

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

- October 6, 2011, potential vulnerability to air ingestion at the turbine-driven auxiliary feedwater pump during certain accidents, Callaway Action Request 199700957

- November 5, 2011, impact of essential service water system water hammer event, Callaway Action Request 201109422

- November 18, 2011, licensee generated list of degraded, nonconforming conditions requiring resolution for mode changes

- December 12, 2011, cumulative review of operator workarounds

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

b. Findings

No findings were identified.

4OA3 Event Follow-up (71153)

a. Event Response

On September 26, 2011, at 11:06 a.m., with the plant at full power, the supply breaker to inverter NN11 opened unexpectedly causing 120 VAC safety related bus NN01 to transfer to its alternate power supply. The licensee entered Technical Specification 3.8.7.a, a 24-hour shutdown action. Four hours later, the normal power supply was restored.

On October 21, 2011, at 1:21 p.m., with the plant in Mode 6, Callaway Plant operators responded to a loss of one of the two incoming offsite power feeds to the plant due to an unplanned opening of safeguards transformer B output breaker 52-3 during relay testing.

On November 1, 2011, at 8:15 a.m., with the reactor defueled and the refueling pool level 23 feet above the reactor vessel flange, steam generator B bowl drain plug became dislodged. Plant operators operated residual heat removal pumps to drain the pool to mid-loop level as immediate corrective action for the unisolable leak. An estimated 4000 gallons of reactor coolant system water leaked onto the containment floor inside the bioshield area. The cause determination for the steam generator bowl drain plug failure was ongoing at the conclusion of this inspection.

On December 21, 2011, at 10:02 a.m., while running emergency diesel generator B for a routine surveillance, a fire was reported in the diesel's jacket water heater. Operators secured the diesel and extinguished the fire within 10 minutes. The cause was traced to a loose screw in the jacket water heater breaker starter housing. No damage to the diesel engine occurred, however, the jacket water heater and heater breaker were replaced.

In each case, NRC resident inspectors responded to the plant to review plant status, communicate the event to supervision, evaluate performance of mitigating systems and ensure proper licensee actions, event classification, and notifications to the NRC and state/county governments.

b. Findings

.1 Introduction. The inspectors reviewed a Green self-revealing non-cited violation of Technical Specification 5.4.1.a, "Procedures," involving the licensee's failure to take action to appropriately isolate an electrical power supply during maintenance on control room air conditioning unit, train A.

Description. On September 23, 2011, a current surge resulted in the power supply breaker to safety related instrument inverter NN11 opening. Inverter NN11 is the normal power supply to the safety related 120 VAC bus NN01. As designed, the inverter shifted

to its alternate supply and the bus did not lose power. This caused an unplanned entry into a 24-hour shutdown action statement per Technical Specification 3.8.7.a.

The licensee determined that an arc was observed while landing power leads on electrical cabinet GK198A associated with control room air conditioning unit SGK04A during maintenance. This caused the current surge which opened the inverter's normal power supply breaker. The lead inside the cabinet was supposed to have been deenergized by the Workman's Protection Assurance isolation lockout tagout prior to commencing work.

Unit SGK04A was identified to be removed as interference for a weld repair on an adjacent pipe. The reactor operator's Workman's Protection Assurance review of associated drawings failed to identify and isolate all of the power to the cabinet. The primary drawing used (E-23GK02B) contained no clear reference to the power supply. Subsequent investigation determined that one of the additional drawings, E-23GK02C, did reference the power supply.

As a result of the missed isolation, the maintenance workers who initially de-terminated the leads to remove the cabinet experienced an unexpected electrical arc. However, the workers failed to properly notify their supervisor and isolate the source of power. The workers taped the ends and proceeded with the work. After the work was complete, different workers were assigned to re-terminate the leads to reinstall the cabinet. These workers were unaware that there were live leads that would be connected and did not perform "Live-Dead-Live" voltage checks as required. They noted the wires with the taped ends and believed they could be energized but still did not verify or question this before reconnecting them. When the leads were re-terminated, they grounded the bus through the cabinet causing the protective relays in inverter NN11 to open the normal supply breaker on overcurrent.

As immediate corrective action the licensee restored normal power to inverter NN11 within 4 hours and exited the technical specification action statement. Callaway Action Request 201107612 was initiated to evaluate the cause and extent-of-condition and specify corrective actions.

Analysis. Failure to stop work when a lockout tagout isolation for maintenance was discovered to be inadequate was a performance deficiency. This finding is more than minor because it is associated with the configuration control attribute of the Mitigating Systems Cornerstone and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, inverter NN11 was rendered less reliable by improper maintenance. Using Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," this finding was of very low safety significance because it did not create a loss of system safety function of a single train for greater than the technical specification allowed outage times, and did not affect seismic, flooding, or severe weather initiating events. This finding has a cross-cutting aspect in the area of human performance associated with the work practices component because

licensee personnel failed to stop in the face of uncertainty or unexpected circumstances [H.4(a)].

Enforcement. Technical Specification 5.4.1.a, “Procedures,” requires 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 1.c, requires procedures for equipment control (e.g., locking and tagging). Callaway Procedure APA-ZZ-00310, “Workman’s Protection Assurance,” Revision 45, Step 4.11.4, states that “IF it is determined that the WPA Tagging is NOT adequate for a particular Job…STOP work on the associated Job until adequate WPA Tagging is placed.” Contrary to the above, on September 23, 2011, the licensee's procedures for equipment control were not implemented for activities specified in Appendix A of Regulatory Guide 1.33. Specifically, maintenance workers failed to notify operations and continued to work when the energized wires were discovered. Subsequently, grounding of the live lead caused an excessive current which opened the normal breaker for the 120 VAC inverter NN11. Because this finding is of very low safety significance and was entered into the licensee's corrective action program as Callaway Action Request 201107612, this violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000483/2011005-06, “Failure to Isolate Control Room Air Conditioning Unit SGK04A for Maintenance.”

.2 Introduction. The inspectors reviewed a Green self-revealing non-cited violation of Technical Specification 5.4.1.a, “Procedures,” involving the licensee’s failure to ensure compliance with relay test maintenance procedures and associated job task guidance in the electrical switchyard.

Description. On October 21, 2011, Callaway Plant was in Mode 6 with switchyard activities in progress to test transfer trip and lockout relay devices associated with switchyard bus A and safeguards transformer A. Emergency diesel generator A and undervoltage start circuitry for the emergency diesel generator A bus were out of service. At 1:21 p.m. the control room operators received several annunciators indicating that the diesel generator A bus had become deenergized and was in a lockout condition. Safeguards transformer B breaker 52-3 had opened and the other bus feeder breakers were also open. Without power to the bus, all the bus loads became unavailable, including residual heat removal pump A.

The switchyard transfer trip work was approved prior to the outage and was performed per Job 09511787, which referred the electrical worker to Procedure MPE-ZZ-QY054, "Inspection, Test, Calibration of Protective Instantaneous Overcurrent Relay, GE type.” The lockout relay testing per Job 09511798 and Procedure MPE-ZZ-NY161, “Operational Test Sequence of 345 kV Safeguards Transformer A Circuit Breakers,” was not approved for the outage. It was submitted during the outage on outage add form 4589 but was disapproved.

The corporate office relay test workers convinced the onsite engineering group that resources and test setup were similar for both of these jobs. Thus, engineering supported addition of just the actuation steps from Job 09511798 to the end of the

Job 09511787 work instructions. The additional steps in the job were performed just after the transfer trip procedure had been completed. The relay test engineer incorrectly assumed that safe working conditions for the transfer trip setup still existed. Step 7.1.14 of lockout relay test Procedure MPE-ZZ-NY161 required manually operating the lockout relay to simulate a breaker 52-3 lockout. Instead, the technician electrically operated the lockout relay, which unintentionally opened breaker 52-3. The technician failed to realize that steps 7.2.4 and 8.10 of Procedure MPE-ZZ-QY054 had been completed earlier during transfer trip testing. These steps opened and then closed all test switches for the transfer trip function of the lockout relays. Had the Procedure MPE-ZZ-QY054 tripping sequence test been started at the beginning, bus NB01 would not have been deenergized. The inadvertent loss of bus NB01 resulted in a loss of one of the two residual heat removal pumps, but not residual heat removal flow. Immediate corrective action was to stop all switchyard work and determine the cause of the bus lockout. The issue was entered into the licensee's corrective action program as Callaway Action Request 201108691.

Analysis. Failure to establish the safe working conditions per the transfer trip procedure and failure to operate the lockout relay in the manner specified by the lockout relay procedure were performance deficiencies. This finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the availability of one of the two offsite power feeds to the plant was lost and the capability of shutdown cooling was reduced. Using Manual Chapter 0609, Appendix G, Attachment 1, Checklist 4 – "PWR Refueling Operation: RCS level > 23' OR PWR Shutdown Operation with Time to Boil >2 hours And Inventory in the Pressurizer," this finding was of very low safety significance because it did not increase the likelihood of a loss of reactor coolant system inventory, did not degrade the ability to terminate a leak path or add reactor coolant system inventory when needed, and did not degrade the ability to recover decay heat removal, if lost. This finding has a cross-cutting aspect in the area of human performance associated with the work controls component because the electrical relay test technicians, onsite engineering, and work control staff failed to adequately maintain interfaces to communicate and safely coordinate significant switchyard activities to assure proper human performance [H.3(b)].

Enforcement. Technical Specification 5.4.1.a, "Procedures," requires that written procedures be established, implemented and maintained covering the activities specified in Appendix A of Regulatory Guide 1.33, "Quality Assurance Program Requirements," February 1978. Appendix A, Item 9.a, required procedures for maintenance testing. Procedure MPE-ZZ-QY054, "Inspection, Test, Calibration of Protective Instantaneous Overcurrent Relay, GE type," Revision 6, and Procedure MPE-ZZ-NY161, "Operational Test Sequence of 345 kV Safeguards Transformer A Circuit Breakers," Revision 5,were maintenance test procedures. Contrary to the above, on October 21, 2011, the licensee failed to correctly implement a written procedure covering an activity specified in Appendix A of regulatory Guide 1.33. Specifically, electrical relay test personnel did not manually operate the lockout relay per Step 7.1.14 of test Procedure MPE-ZZ-NY161

device 86-3. The relay technicians also failed to perform step 7.2.4 of Procedure MPE-ZZ-QY054 to open all applicable test switches for the lockout relays. This resulted in a loss of train A components. Because this finding is of very low safety significance and was entered into the licensee's corrective action program as Callaway Action Request 201108691, this violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000483/2011005-07, “Failure to Correctly Implement Plant Maintenance Procedures.”

.3 (Closed) Licensee Event Reports 2010-009-00, 2010-009-01, and 2010-009-02: High-Energy Line Break (HELB) Program Deficiencies

On December 1, 2010, the licensee Nuclear Oversight audit of engineering programs identified deficiencies in the Callaway Plant high-energy line break barrier program. Subsequent evaluation of these issues revealed three failures to maintain the operability of equipment located in the train A electrical penetration room following a potential high-energy line break in nonseismically analyzed auxiliary steam piping. Specifically, the harsh environment from a high-energy line break had the potential to impact safety related motor control center NG01B. The licensee identified five areas with deficient high-energy line break barrier controls. These instances involved inadequate control of high-energy line break barrier impairments and inadequate analysis of the high-energy line break hazards in engineering evaluations. License Event Reports 2010-009-00, 2010-009-01, and 2010-009-02 were submitted pursuant to 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(ii)(B) as a condition prohibited by technical specifications and an unanalyzed condition that significantly degraded plant safety because plant equipment that would have been required to respond to a postulated high-energy line break event may not have been available. The resident inspectors and a Region IV senior risk analyst reviewed the licensee's most recent submittal and determined that the report adequately documented the issue, including the potential safety consequences and necessary corrective actions. Enforcement aspects associated with these license event reports are discussed in Section 40A7. No additional violations were identified during the inspectors' review. These license event reports are closed.

4OA6 Meetings

Exit Meeting Summary

On October 21, 2011, the inspectors presented the results of the radiation safety inspections 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.

On June 24, 2011, the inspectors discussed the results of the licensed operator requalification program inspection with Mr. C. Reasoner, Vice President Engineering, and other members of the licensee's staff. The lead inspector obtained the final biennial examination results and telephonically exited with Mr. R. Barton, Manager, Training, on November 30, 2011. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any

materials examined during the inspection should be considered proprietary. No proprietary information was identified

On October 28, 2011, the inspectors presented the inspection results of the review of in-service inspection activities to Mr. R. Barton, Manager, Training, 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 January 3, 2012, the resident inspectors presented the inspection results to Mr. F. Diya, Vice President Nuclear Operations, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspector 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 non-cited violations. Documents reviewed in this inspection are listed in the attachment.

- Title 10 of the Code of Federal Regulations, Section 55.49, requires, in part, that facility licensees shall not engage in any activity that compromises the integrity of any application, test, or examination required by this part. The integrity of a test or examination is considered compromised if any activity, regardless of intent, affected, or, but for detection, would have affected the equitable and consistent administration of the test or examination. This includes activities related to the preparation, administration, and grading of the tests and examinations required by this part. Contrary to the above, during the 2010 annual operating exam cycle, the licensee engaged in an activity that compromised the integrity of a test required by 10 CFR Part 55. Specifically, training personnel administered JPMs to licensed operators on their operating tests that had been used for previous exams in excess of 50 percent. Administering an operating test with greater than 50 percent overlap from previously administered operating tests is considered a compromise of the integrity of the test in that it is a practice that, but for detection, would affect the equitable and consistent administration of the these tests. The finding was more than minor because it adversely impacted the human performance attribute of the mitigating systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, if left uncorrected, the performance deficiency could have become more significant in that allowing licensed operators to return to the control room without valid demonstration of appropriate knowledge and abilities on the annual operating exams could be a precursor to a significant event if undetected performance deficiencies develop. The licensee has entered this issue into their corrective action program as Callaway Action Request 201009333. The finding was determined to have very low safety significance because, although the finding resulted in a compromise of the integrity of operating test components (JPMs) and compensatory

actions were not immediately taken when the compromise should have been discovered in 2010, the equitable and consistent administration of the test was not actually impacted by this compromise.

- Technical Specification 3.8.9, “Distribution Systems – Operating,” required, in part, that any applicable inoperable distribution subsystem be restored within 8 hours. Technical Specification 3.8.9, Required Action D.1, required Mode 3 entry within 6 additional hours. Contrary to the above, in the three years prior to December 1, 2010, the licensee identified three failures to maintain the operability of equipment located in the electrical penetration room, train A, following a potential high-energy line break in nonnuclear, nonseismically analyzed auxiliary steam piping to the boric acid batching tank. Specifically, the harsh environment from a high-energy line break had the potential to impact safety related motor control center NG01B located in room 1410 for greater than the allowed 8 plus 6 hours. Additionally the licensee identified five areas with deficient high-energy line break barrier controls. The details of these deficient barrier controls were documented in License Event Report 05000483/2010-009-02. This finding is greater than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely 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 3 significance determination to evaluate the cumulative risk of the multiple high-energy line break deficient barrier controls.

  The Region IV senior reactor analyst evaluated each case separately. For each area the approximate steam pipe break frequency was determined to be 2.5E-11/ft-hour. Each initiating event frequency was adjusted by the exposure period to obtain the initiating event frequency on a per year basis. Thus the event frequencies were 2.5E-11*Length*Exposure time/year. The analyst used the Callaway Standardized Plant Analysis Risk model to calculate the conditional core damage probabilities. The Standardized Plant Analysis Risk analysis assumed that the steam line break occurred and that the affected component failed and was not recoverable. The analyst determined that the five cases total change in core damage frequency was less than 2.3E-8/year. Because the delta core damage frequency 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 entered in the licensee’s corrective action program as Callaway Action Request 201102329.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

R. Barton, Manager, Training
K. Blair, Steam Generator Engineer
J. Cortez, Assistant Manager, Operations Training
J. Doughty, Inservice Inspection Program Owner
K. Gilliam, Supervisor, Radiation Protection
L. Graessle, Director, Plant Support
J. Little, Regulatory Affairs, Supervisory Engineer
A. Lord, Supervising Engineer, Simulator
D. Neterer, Plant Director
S. Petzel, Consulting Engineer, Licensing
C. Reasoner, Vice President Engineering
A. Schnitz, Engineer, Licensing
C. Smith, Manager, Radiation Protection
D. Stepanovic, Project Manager, Maintenance
D. Thompson, Health Physicist
R. Tiefenauer, Senior Training Supervisor
L. Wilhelm, Operations Supervisor, Operations Training

LIST OF ITEMS OPENED AND CLOSED

Opened and Closed

05000483/2011005-01	NCV	Failure to Ensure Separation of Stainless Steel and Carbon Steel Hand Files and Wire Brushes (Section 1R08.1)
05000483/2011005-02	NCV	Failure to Maintain Simulator Fidelity (Section 1R11.2.b.1)
05000483/2011005-03	FIN	Failure to Conduct Simulator Testing In Accordance With ANSI/ANS 3.5-1998 (Section 1R11.2.b.2)
05000483/2011005-04	NCV	Failure to Adequately Assess and Manage Outage Risk Associated with Significant Switchyard Work (Section 1R13)
05000483/2011005-05	NCV	Improper Ground and Test Device Damages Residual Heat Removal Pump Switchgear (Section 1R19)
05000483/2011005-06	NCV	Failure to Isolate Control Room Air Conditioning Unit SGK04A for Maintenance (Section 4OA3.b.1)
05000483/2011005-07	NCV	Failure to Correctly Implement Plant Maintenance Procedures (Section 4OA3.b.2)

Closed

05000483-2010-009-00 05000483-2010-009-01 05000483-2010-009-02	LER	High Energy Line Break (HELB) Program Deficiencies (Section 4OA3)

LIST OF DOCUMENTS REVIEWED

Section 1RO1: Adverse Weather Protection

PROCEDURES

NUMBER	TITLE	REVISION
OTS-ZZ-00007	Plant Cold Weather	24

Section 1RO4: Equipment Alignment

PROCEDURES

NUMBER	TITLE	REVISION
MTM-SM-00001	Containment Equipment Hatch Operation for Temporary Opening and Closing	4
OSP-BG-00002	CCP Pumps are Incapable of Injection	19
OSP-EM-00002	SI Pumps are Incapable of Injection	20
OTN-KF-00001	Portable Diesel Generator Operation	0

DRAWINGS

NUMBER	TITLE	REVISION
8600-X-90026	"300" Series On-Site Electrical Power Distribution System	53
8600-G-90032	Cable Schedule Outside Areas	36
8600-X-88861	Ductbanks and Manholes Site Plant Area 2 On-Site Electrical Power Distribution-Comm. Singer and Control Systems	17-19

ENGINEERING CHANGE NOTICES

NUMBER	TITLE	REVISION
8600-G-90031	Cable Schedule (Outside Areas)	64
8600-G-90032	Cable Schedule (Outside Areas)	68

CALLAWAY ACTION REQUESTS

201108519 201109687

JOBS

10509137/550 10509137/400

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE
PM0901003	CCP is incapable of injection
PM0905026	SI Pumps are incapable of injection

Section 1RO5: Fire Protection

PROCEDURES

NUMBER	TITLE	REVISION
APA-ZZ-0703	Fire Protection Operability Criteria and Surveillance Requirements	20
APA-ZZ-00741	Control of Combustible Materials	22

CALLAWAY ACTION REQUESTS

20119569 201110526

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE	DATE
EN# 47426	Event Notification 47426 regarding unanalyzed fire barrier for High Density Polyethylene piping in Room 3101	November 9, 2011

Fire Hazards Analysis Report for Final Safety Analysis Report Chapter 9.5.8

Section 1R07: Heat Sink Performance

PROCEDURES

NUMBER	TITLE	REVISION / DATE
APA-ZZ-01025, Appendix A	Raw Water Chemistry Strategic Optimization Plan	0
EDP-ZZ-01112	Heat Exchanger Predictive Performance Manual	17
ETP-EG-00004	Thermal Performance Test of the Callaway Nuclear Plant CCW Heat Exchanges (EEG01B)	October 15, 2011
ETP-ZZ-03001	GL 89-13 Heat Exchanger Inspection	9

CALLAWAY ACTION REQUESTS

201108599 201108761

Section 1RO8: Inservice Inspection Activities

PROCEDURES

NUMBER	TITLE	REVISION
QCP-ZZ-05048	Boric Acid Walkdown for RCS Pressure Boundary	7
EDP-ZZ-01004	Boric Acid Corrosion Control Program	11
QCP-ZZ-05000	Liquid Penetrant Examination	21
QCP-ZZ-05040	Visual Examination to ASME VT-1	21
QCP-ZZ-0542	Visual Examination to ASME VT-3	19
AUE-UT-98-1	Manual Ultrasonic Examination of Ferritic Piping Welds	1
AUE-UT-98-2	Manual Ultrasonic Examination of Austenitic Piping Welds	1
ECT-BB-01309	Steam Generator Eddy Current Testing Acquisition and Analysis Guidelines	22
EDP-BB-01341	Steam Generator Surveillance	5
MDP-ZZ-LM001	Fluid Leak Management Program	10
MTW-ZZ-WP514	Welding of P-8 Materials	14
MTW-ZZ-WP501	Welding of P-1 Materials	13

WELD PROCEDURE SPECIFICATIONS

NUMBER	TITLE	REVISION
WPS-0808T01	GTAW of P8 Materials [Max Deposit Thickness ≤ 3/4”]	14
WPS-0101TS20	GTAW/SMAW Welding of Impact Tested P1 Group 1 and Group 2 Materials ≤ 2.5” Thick	13

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE	REVISION / DATE
SA10-PE-C11	Boric Acid Corrosion Control Program (BACCP) Simple Benchmark Report	
51-9048595-000	Condition Monitoring and Operational Assessment for Callaway (EOC-15)	April 18, 2007
51-9167781-000	Callaway 1R18 Degradation Assessment October 2011	October 17, 2011
51-9167588-000	Callaway 1R18 ECT Inspection Plan	0
SA 10-PE-S01	Steam Generator Program Self Assessment	April 7, 2010
0239995	Material Receipt Inspection Report for Shurtape, Stock No: 6371216	December 6, 2010
5042-11-069	VT-3 Examination Report for Snubber EM01R024112A	October 25, 2011
5042-11-070	VT-3 Examination Report for Snubber EM01R021112A	October 25, 2011
5042-11-071	VT-3 Examination Report for Snubber EM01R027112A	October 25, 2011
5042-11-072	VT-3 Examination Report for Snubber EM01R026112B	October 25, 2011
5041-11-038	RPV Head Penetrations Examination	November 1, 2011

CALLAWAY ACTION REQUESTS

201005159	201011002	201101013	201101278	201102042
201105718	201010669	201003732	201003361	201003755
201005077	201007999	201107472	201107806	201108921
201108411	201108548	201108921	201108908	200811191

Section 1R11: Licensed Operator Requalification

PROCEDURES

NUMBER	TITLE	REVISION
APA-ZZ-00395	Significant Operator Response Timing	17
CPTM-OPS	Callaway Plant Training Manual, Operations Programs	22
TDP-IS-00001	Simulator Operation and Maintenance	9
TDP-IS-00002	Simulator Configuration Management	18

TDP-ZZ-00010	Operational Evaluations	23
TDP-ZZ-00019	NRC License Examination Security and Integrity	16
APA-ZZ-00912	Callaway Plant Medical Certification Program	16
EIP-ZZ-00101	Classification of Emergencies	47
ODP-ZZ-00001, Attachment 2	Medical and Physical Qualifications	65
PM0900219	12 Week Periodic Verification of SCBA Lenses	65

CONDITION REPORTS

200905155	200905373	200904734	200905844
200906101	200906271	200908596	200908687
200910589	201000189	20100484	201004301
201009333	201010484	20109145	201101255
201101283	201101783	201101788	201101982
201102627	201103287	201103748	201103825
201103978	201103981	201104020	201105122
201105132	201105133	201107912	

AUDITS, SELF-ASSESSMENTS, AND SURVEILLANCES

NUMBER	TITLE	DATE
SA10-TR-F03	Plant-Referenced Simulator Formal Self-Assessment	
	Summary Report: Results from Annual Operational Examinations – 2011	May-June 2011
SA# 201100569-25	Pre-71111.11 Inspection Self-Assessment	June 2011

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE	DATE
	List of 2011 Annual Exam JPMs and Scenarios	
	2009-2011 Licensed Operator Continuing Training Sample Plan	
URO-SBG-06-P025J	Calculate Boric Acid Addition and Borate RCS During Cooldown Outside Control Room	April 27, 2011
URO-AEO-05-P001J (A)	Locally Start Emergency Diesel	May 2, 2011
URO-SSF-01-C005J	Perform Control Rod Partial Movement Test	April 7, 2011
URO-SBB-04-C166J(A)	Respond to a Master Pressure Controller Failure	May 3, 2011
URO-SAE-02-C097J	TDAFAS Recovery at Power	May 2, 2011
SRO-RER-02-A030J	Emergency Event Classification	May 2, 2011

(TC)		
DS-02	Dynamic Simulator Exam Scenario	May 26, 2011
DS-32	Dynamic Simulator Exam Scenario	June 13, 2011
EOS-SCE-05-P012J	Rotate Stator Cooling Water Heat Exchangers	April 6, 2011
URO-AEO-05-P045J(A)	Locally Close Valves for CIS-B	April 6, 2011
URO-SBG-02-C079J	Swap from the NCP to 'B' CCP	April 6, 2011
URO-AEO-05-C174J(A)	Manually Start Diesel Generators	April 6, 2011
DS-14	Dynamic Simulator Exam Scenario	April 27 2011
	CA-905 Report for Session 20090561, Licensed Operator Continuing Training Cycle 2009-05	August 25, 2009
	CA-905 Report for Session 20090706, Licensed Operator Continuing Training Cycle 2009-06	November 6, 2009
	CA-905 Report for Session 20090830, Licensed Operator Continuing Training Cycle 2010-01	April 9, 2010
	CA-905 Report for Session 20100051, Licensed Operator Continuing Training Cycle 2010-02	February 22, 2010
	CA-905 Report for Session 20100610, Licensed Operator Continuing Training Cycle 2010-03	July 9, 2010
	CA-905 Report for Session 20100950, Licensed Operator Continuing Training Cycle 2011-01	April 20, 2011
	CA-905 Report for Session 20110128, Licensed Operator Continuing Training Cycle 2011-02	April 18, 2011
	Callaway Energy Center Licensed Operator Continuing Training 2011 Biennial Written Exam Report	August 30, 2011
	Summary Report: Results from Annual Operational Examinations – 2011, Licensed Operator Continuing Training, Callaway Energy Center, May-June 2011	July 1, 2011
SIFT 20110018	Verify Correct Values of Key Primary/Secondary Components	April 26, 2011
SIFT 20110001, Test # T2766	Performance Test: Transient 6 Trip of Main Turbine	June 10, 2011
SIFT 20110001,	Performance Test: Steady-State Testing, 100%	July 19,

Test # T0138	BOC	2011
SIFT 20110018, Record 7284	Verify Correct Values of Key Primary/Secondary Components	May 5, 2011
SIFT 20100001, Test # T2770	Transient 10 Slow Primary System Depressurization	February 5, 2010
SIFT 20110001, Test # T0163	BOC (Cycle 16) Controlled 80% Steady State Performance Test (Log Comparison to Plant Data)	July 20, 2011
SIFT 20110001, Test # T0164	BOC (Cycle 18) Controlled 100% Steady State Performance Test (Log Comparison to Plant Data)	July 20, 2011
SIFT 20110001, Test # T0165	MOC (Cycle 18) Controlled 100% Steady State Performance Test (Log Comparison to Plant Data)	July 20, 2011
SIFT 20110001, Test # T0138	BOC (Cycle 18) Controlled 100% Steady State Power Stability Test	July 19, 2011
SIFT 20110001, Test # T0144	MOC (Cycle 18) Controlled 100% Steady State Power Stability Test	July 19, 2011
SIFT 20110001, Test # T0149	ANSI 3.5-1998 Normal Test 4: Reactor Trip and Recovery to 100% Power	July 19, 2011
SIFT 20110001, Test # T0153	ANSI 3.5-1998 Normal Test 8: Plant Shutdown to Cold Shutdown Conditions	July 19, 2011
SIFT 20110001, Test # T0158	BOC (Cycle 18) Certified Ready for Reactor Startup	July 20, 2011
SIFT 20110001, Test # T4640	Tracking – TDP-IS-00001 & TDP-IS-00002	July 19, 2011
SIFT 20110001, Test # T5003	ANSI 3.5-1998 Time Test – Stopwatch vs. Valve Stroke	July 21, 2011
SIFT 20110001, Test # T5004	ANSI 3.5-1998 Time Test – Stopwatch vs. Annunciator Flash Rate	July 20, 2011
SIFT 20110001, Test # T5006	ANSI 3.5-1995 Time Test – Stopwatch vs. Transient Time	July 21, 2011
SIFT 20110001, Test # T5309	ANSI 3.5-1998 Time - Repeatability	July 21, 2011
SIFT 20110001, Test # T5345	BOC (Cycle 16) Controlled 60% Steady State	July 21, 2011
SIFT 20110001, Test # T5351	MOC (Cycle 18) Controlled MOC Reactor Startup	July 21, 2011
SIFT 20110001, Test # T2763	Transient 3 Fast Close of MSIV’s	July 21, 2011
SIFT 20110001, Test # T2762	Transient 2 Loss of All Feedwater	July 21, 2011
	2010 Simulator Testing Binders	

Section 1R12: Maintenance Effectiveness

PROCEDURES

NUMBER	TITLE	REVISION
APA-ZZ-00500, App 5	Maintenance Rule (MR)	53
EDP-ZZ-01128	Maintenance Rule Program	17
EDP-ZZ-01128, Appendix 4	Maintenance Rule System Functions	5

DRAWINGS

NUMBER	TITLE	REVISION
M22-SJ04	Piping and Instrumentation Diagram, Nuclear Sample System	14

CALLAWAY ACTION REQUESTS

200903667	201102158	201106551	201110163	201110202
201110568				

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE	DATE
ISTC	ASME Omb Code, subsection ISTC, Inservice Testing of Valves in Light-Water Reactor Nuclear Power Plants	2000

Section 1R13: Maintenance Risk Assessment and Emergent Work Controls

PROCEDURES

NUMBER	TITLE	REVISION
EDP-ZZ-001129	Callaway Plant Risk Assessment	27
EDP-ZZ-001129, Attachment 5B	Shutdown Safety Assessment-Mode 5-Loops Not Filled or Mode 6-RCS Inventory Between 3 ft. Below Vessel Flange	27
EDP-ZZ-001129, Attachment 6	Shutdown Safety Assessment-Mode 6-Refueling Operations >=23 ft. Above Vessel Flange	27

CALLAWAY ACTION REQUESTS

201108888	201108691

JOBS

09511787

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE	REVISION
PRAER 11-361	Risk Evaluation for atmospheric steam dump valve ABPV00001 being out of service greater than 7 days	0

Section 1R15: Operability Evaluations and Functionality Assessments

PROCEDURES

NUMBER	TITLE	REVISION
APA-ZZ-00500, Appendix 1	Operability and Functionality Determinations	15

CALLAWAY ACTION REQUESTS

201108490	201109948	201110012	201110034

Section 1R18: Plant Modifications

DRAWINGS

NUMBER
M23EA01

CALLAWAY ACTION REQUESTS

200909909	201007454

JOBS

10006321	10006322

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE	REVISION / DATE
MP-10-0003/000	Install Service Water Check Valves to Minimize ESW Water Hammer During LOOP and ESFAS Testing	1
MP-10-0004/000	Revise Sequencer Operation of EFHV0037 and EFHV0038	August 18, 2011
FCN 01	Install Service Water Check Valves to Minimize ESW Water Hammer During LOOP and ESFAS Testing	1

Section 1R19: Postmaintenance Testing

PROCEDURES

NUMBER	TITLE	REVISION
MSE-UB-NC002	TSC HVAC Flows in Filter Mode	7
OTS-PA-00001	Operation and Testing of the Alternate Emergency Power Source Diesels	4

CALLAWAY ACTION REQUESTS

201109948	201109122

JOBS

04503768	05517259	07003942	10006323	10509409
10513172	11000199	11004604	11006744	

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE	DATE
T67.202I Q	Callaway Nuclear Plant Maintenance Electrical Qualification Card and Standard: Installation And Removal Of Westinghouse & General Electric Ground And Test Device	July 28, 2011

Section 1R20: Refueling and Other Outage Activities

PROCEDURES

NUMBER	TITLE	REVISION
APA-ZZ-00365, Addendum L	Callaway Lifting Operations	9
ESP-SF-00001	Rod Drop Testing Using the Plant Computer - IPTE	21
ESP-SM-01001	Containment Leakage Rate Testing Program	23
ESP-ZZ-00024	Low Power Physics Testing Data Acquisition	9
ETP-BB-03147, Addendum 02	Preparation for Reactor Vessel Head Lift	4
ETP-BB-03148	Reactor Vessel Upper Internals Removal - IPTE	17
ETP-BB-03154	Reactor Vessel Head Installation - IPTE	16
ETP-ZZ-00003	Inspection of New Fuel	17
ETP-ZZ-00012	Inverse Count Rate Ratio (ICRR) Monitoring for Approach to Criticality	13
MTM-SM-00001	Containment Equipment Hatch Operation for Temporary Opening and Closing	4
OTG-ZZ-00001	Plant Heatup Cold Shutdown to Hot Standby	73
OTG-ZZ-00002	Reactor Startup - IPTE	48
OTG-ZZ-00003	Plant Startup Hot Zero Power to 30% Power - IPTE	54
OTG-ZZ-00004	Power Operation	82
OTG-ZZ-00005	Plant Shutdown 20% Power to Hot Standby	40
OTG-ZZ-00005, Addendum 01	Opening Reactor Trip Breaker in Mode 2 - IPTE	4
OTG-ZZ-00005, Addendum 02	Control Bank Insertion	1
OTG-ZZ-00006	Plant Cooldown Hot Standby to Cold Shutdown	63

OTG-ZZ-00006, Addendum 2	Shutdown Bank Insertion	2
OTG-ZZ-00006, Addendum 04	Initial RCS Depressurization and SI Block	6
OTG-ZZ-00006, Addendum 10	Pressurizer Solid Operation - IPTE	14
OTN-BB-00001	Reactor Coolant System – IPTE “Establishing a Vacuum from Mid-Loop	37
OTN-BB-00002-Addendum 06	Draining the RCS to Limited Inventory or Reduced Inventory – IPTE	18
OTN-KF-00001	Outside Containment Alternate Power Source Alignment	3
OTO-KE-00001	Fuel Handling Accident	14
OTS-KE-00003	Unloading and Storage of New Fuel Assemblies and Inserts	29

DRAWINGS

8600-X-90026	"300" Series On-Site Electric Power Distribution System	53

CALLAWAY ACTION REQUESTS

201108490 201108910 201108919 201108839 201108841

201109257

JOBS

09513297/561 10506731

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE	REVISION / DATE
201109257	Event Review Team Meeting Summary, Drain Plug in B SG Hot Leg Manway Failed	November 1, 2011
8600-G-90031	Union Electric Conduit Schedule (Outside Areas)	64
A190.0031	Workplace Fatigue Assessment Tool v2.1	2.1
CN-SEE-1-08-24	Callaway Reduced Indeterminate Coatings Calculation	0

EOSL # 18149	Equipment Out of Service Entry 18149, P-4/564 FWIS bypassed for plant shutdown per OTG-ZZ-00006	October 15, 2011
SP11-023	Supplemental Personnel Processing Surveillance Report	

Section 1R22: Surveillance Testing

PROCEDURES

NUMBER	TITLE	REVISION
ESP-AB-01000	Main Steam Safety Valve Set Pressure Testing – IPTE	10
ISP-SM-LL0L1	Containment Personnel Access Hatch and Emergency Access Hatch Door Seal Leak Rate Test	9
ISP-SM-LL0L4	Containment Personnel Hatch Shaft Seal Leak Rate Test	5
OSP-AE-V02HS	Main Feedwater Isolation Valve Inservice Test	35a
OSP-AE-V02HS	Main Feedwater Isolation Valve Inservice Test	35b
OSP-AL-V0003	Auxiliary Feedwater Pump Discharge Check Valve Closure Test	14
OSP-BB-00007	RCS Heat Up and Cooldown Limitations	13
OSP-BB-V002B	Reactor Vessel Head Vent Valves Inservice Test	12
OSP-BB-VL006	RCS Pressure Isolation Valves Inservice Tests	41
OSP-NE-0024B	Standby Diesel Generator B 24 Hour Run and Hot Restart Test	37a
OSP-SA-00004, Attachment 2	Visual Inspection of Containment for Establishing Containment Cleanliness	23
OSP-SA-2413A	Train A Diesel Generator and Sequencer Testing	14
OSP-SF-00001	Shutdown Margin Calculation while Subcritical	34

DRAWINGS

NUMBER	TITLE	REVISION
E-23BB30	Schematic Diagram, RCS Head Vent Valves	2

CALLAWAY ACTION REQUESTS

201107653	201107635	201107629	201107620	201108305
201109962				

JOBS

10506267	2050797	10509161	10509162	10509409

Section 2RS01: Radiological Hazard Assessment and Exposure Controls

PROCEDURES

NUMBER	TITLE	REVISION
APA-ZZ-00014	Conduct of Operations – Radiation Protection	21
APA-ZZ-01000	Callaway Energy Center Radiation Protection Program	35
APA-ZZ-01004	Radiological Work Standards	19
APA-ZZ-01106	Lock and Key Control	21
HDP-ZZ-01100	ALARA Planning and Review	12
HDP-ZZ-01200	Radiation Work Permits	16
HDP-ZZ-01203	Radiological Area Access Control	45
HTP-ZZ-01433	Personnel Exposure Records	48
HDP-ZZ-01500	Radiological Postings	37
HTP-ZZ-02004	Control of Radioactive Sources	33
HTP-ZZ-06001	High Radiation/ Locked High Radiation/Very High Radiation Area Access	42

AUDITS, SELF-ASSESSMENTS, AND SURVEILLANCES

NUMBER	TITLE	DATE
AP11-001	Nuclear Oversight Audit of Radiation Protection	March 1, 2011
SA10-RP-C01	Simple Benchmark Report – Access Control and As Found Protocol	November 30, 2010
SA10-RP-S03	Self-Assessment Topic Offsite Vendors	December 6, 2010
SP10-016	Surveillance Report	May 13, 2010
SP10-018	Surveillance Report	May 19, 2010
SP11-006	Surveillance Report	March 17, 2011
SP11-011	Surveillance Report	May 12, 2011
SP11-016	Surveillance Report	July 13, 2011

CALLAWAY ACTION REQUESTS

200903953	201003315	201003753	20003778	201003947
201003992	201004121	201004273	201004593	201004694
201005016	201005577	201007036	201007871	201008822
201009080	201009340	201011732	201100543	201100708
201100768	201100840	201102671	201103048	201103349
201103876	201103877	201103878	201103901	201105004
201106381	201106382	201106443	201108642	

RADIATION WORK PERMITS

NUMBER	TITLE	REVISION
05510321500	Service Limitorque Operator and Perform MOVATS for ENHV0012	1
05510321500	Service Limitorque Operator and Perform MOVATS for ENHV0012	0
08511161	A RHR TSO Work in Room 1111	3
08511161	A RHR TSO Work in Room 1111	2
08511161	A RHR TSO Work in Room 1111	1
08511161	A RHR TSO Work in Room 1111	0
170813187	Move/ Install Stud Tensioner Hoists, Detension Reactor Vessel Studs, Remove Reactor Vessel Studs, Clean Stud Holes, Lubricate Stud Holes, Install Stud Hole Plugs, Install Guides Studs, and Prepare Stud Cans	2
170813187	Move/ Install Stud Tensioner Hoists, Detension Reactor Vessel Studs, Remove Reactor Vessel Studs, Clean Stud Holes, Lubricate Stud Holes, Install Stud Hole Plugs, Install Guides Studs, and Prepare Stud Cans	1
170813187	Move/ Install Stud Tensioner Hoists, Detension Reactor Vessel Studs, Remove Reactor Vessel Studs, Clean Stud Holes, Lubricate Stud Holes, Install Stud Hole Plugs, Install Guides Studs, and Prepare Stud Cans	0
180813187	Detension Reactor Vessel Studs, Remove Reactor Vessel Studs, Clean Stud Holes, Lubricate Stud Holes, Install Stud Hole Plugs, Install Guides Studs, and Prepare Stud Cans	1
180813187	Detension Reactor Vessel Studs, Remove Reactor Vessel Studs, Clean Stud Holes, Lubricate Stud Holes, Install Stud Hole Plugs, Install Guides Studs, and Prepare Stud Cans	0
180917004EC	Area and Equipment Setup. Steam Generator Tube Eddy Current Testing in All Four Steam Generators. Area and Equipment Tear Down After Eddy Current Testing Complete	0

190701NRC	Nuclear Regulatory Commission (NRC) Tours and Inspections in the RCA, Including the Reactor Building, During Refueling 18 (this RWP includes access to Satellite RCAs)	0

Section 2RS02: Occupational ALARA Planning and Controls

PROCEDURES

NUMBER	TITLE	REVISION
APA-ZZ-00014	Conduct of Operations – Radiation Protection	21
APA-ZZ-01000	Callaway Energy Center Radiation Protection Program	35
APA-ZZ-01004	Radiological Work Standards	19
APA-ZZ-01106	Lock and Key Control	21
HDP-ZZ-01100	ALARA Planning and Review	12
HDP-ZZ-01200	Radiation Work Permits	16
HDP-ZZ-01203	Radiological Area Access Control	45
HTP-ZZ-01433	Personnel Exposure Records	48
HDP-ZZ-01500	Radiological Postings	37
HTP-ZZ-02004	Control of Radioactive Sources	33
HTP-ZZ-06001	High Radiation/ Locked High Radiation/Very High Radiation Area Access	42

AUDITS, SELF-ASSESSMENTS, AND SURVEILLANCES

NUMBER	TITLE	DATE
AP11-001	Nuclear Oversight Audit of Radiation Protection	March 1, 2011
SA10-RP-C01	Simple Benchmark Report – Access Control and As Found Protocol	November 30, 2010
SA10-RP-S03	Self-Assessment Topic Offsite Vendors	December 6, 2010
SP10-016	Surveillance Report	May 13, 2010
SP10-018	Surveillance Report	May 19, 2010
SP11-006	Surveillance Report	March 17, 2011
SP11-011	Surveillance Report	May 12, 2011
SP11-016	Surveillance Report	July 13, 2011

CALLAWAY ACTION REQUESTS

200903953	201003315	201003753	20003778	201003947
201003992	201004121	201004273	201004593	201004694
201005016	201005577	201007036	201007871	201008822

201009080	201009340	201011732	201100543	201100708
201100768	201100840	201102671	201103048	201103349
201103876	201103877	201103878	201103901	201105004
201106381	201106382	201106443	201108642	

RADIATION WORK PERMITS

NUMBER	TITLE	REVISION
05510321500	Service Limitorque Operator and Perform MOVATS for ENHV0012	1
05510321500	Service Limitorque Operator and Perform MOVATS for ENHV0012	0
08511161	A RHR TSO Work in Room 1111	3
08511161	A RHR TSO Work in Room 1111	2
08511161	A RHR TSO Work in Room 1111	1
08511161	A RHR TSO Work in Room 1111	0
170813187	Move/ Install Stud Tensioner Hoists, Detension Reactor Vessel Studs, Remove Reactor Vessel Studs, Clean Stud Holes, Lubricate Stud Holes, Install Stud Hole Plugs, Install Guides Studs, and Prepare Stud Cans	2
170813187	Move/ Install Stud Tensioner Hoists, Detension Reactor Vessel Studs, Remove Reactor Vessel Studs, Clean Stud Holes, Lubricate Stud Holes, Install Stud Hole Plugs, Install Guides Studs, and Prepare Stud Cans	1
170813187	Move/ Install Stud Tensioner Hoists, Detension Reactor Vessel Studs, Remove Reactor Vessel Studs, Clean Stud Holes, Lubricate Stud Holes, Install Stud Hole Plugs, Install Guides Studs, and Prepare Stud Cans	0
180813187	Detension Reactor Vessel Studs, Remove Reactor Vessel Studs, Clean Stud Holes, Lubricate Stud Holes, Install Stud Hole Plugs, Install Guides Studs, and Prepare Stud Cans	1
180813187	Detension Reactor Vessel Studs, Remove Reactor Vessel Studs, Clean Stud Holes, Lubricate Stud Holes, Install Stud Hole Plugs, Install Guides Studs, and Prepare Stud Cans	0
180917004EC	Area and Equipment Setup. Steam Generator Tube Eddy Current Testing in All Four Steam Generators. Area and Equipment Tear Down After Eddy Current Testing Complete	0
190701NRC	Nuclear Regulatory Commission (NRC) Tours and Inspections In The RCA, Including the Reactor Building, During Refueling 18. This RWP includes access to Satellite RCAs.	0

4OA1: Performance Indicator Verification

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE	DATE
CA 2565	NRC Performance Indicator Reports (October 2010 through September 2011)	
CA2786	MSPI Basis Document change forms	December15, 2010

Section 4OA2: Identification and Resolution of Problems

PROCEDURES

NUMBER	TITLE	REVISION
OSP-BN-V005	BN Suction Header Valves Inservice Test	0

CALLAWAY ACTION REQUESTS

199700957	200502313

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE	DATE
DIR 97-1028	Design Input Report for FCHV0312 Limit Switch Adjustment	October 2, 1997

Section 4OA3: Identification and Resolution of Problems

PROCEDURES

NUMBER	TITLE	REVISION
MPE-ZZ-QY054	Inspection, Test, Calibration of Protective Instantaneous Overcurrent Relay, GE type	6
MPE-ZZ-NY161	Operational Test Sequence of 345kv Safeguards Transformer A Circuit Breakers	5
APA-ZZ-00310	Workman’s Protection Assurance	45
SWPM	Safe Work Practices Manual	18

DRAWINGS

NUMBER	TITLE	REVISION
E-23GK02C(Q)	Schematic Diagram Control Room A/C Unit Supply And Discharge Damper	5
E-23GK02B(Q)	Schematic Diagram Control Room A/C Unit fan Control	6
E-23NN01(Q)	Class 1E Instrument AC Schematic	10
M-622, 1-00023	Condensing Unit	19

CALLAWAY ACTION REQUESTS

201108691	201107612	201107604	201109470	201107711
201109122	201109257			

JOBS

09511787

MISCELLANEOUS DOCUMENTS

NUMBER	TITLE
201108651	Outage Scope Addition for XMDV22 Lockout Relay Testing

Section 4OA7: Identification and Resolution of Problems

CALLAWAY ACTION REQUESTS

201102329

The following items are requested for the
Occupational Radiation Safety Inspection
at Callaway Plant
October 17 – 21, 2011
Integrated Report 2011005

Inspection areas are Radiological Hazard Assessment and Exposure Controls (71124.01), Occupational ALARA Planning and Controls (71124.02),

Please provide the requested information in for Regional Inspector review by October 3, 2011.

If you have any questions or comments, please contact me at (817) 860-8165 or e-mail me at Larry.Ricketson@nrc.gov.

1. Radiological Hazard Assessment and Exposure Controls (71124.01)

NOTE: Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for the above inspector should be in a file/folder titled 1- A, Applicable organization charts in file/folder 1- B, etc.

A List of contacts and telephone numbers for the Radiation Protection Organization Staff and Technicians

B Applicable organization charts

C Audits, self-assessments, and LERs written since April 26, 2010, related to this inspection area

D Procedure indexes for the radiation protection procedures

E Please provide specific procedures related to the following areas. Additional Specific Procedures may be requested by number after the inspector reviews the procedure indexes.

1. Radiation Protection Program Description
2. Radiation Protection Conduct of Operations
3. Personnel Dosimetry Program
4. Posting of Radiological Areas
5. High Radiation Area Controls
6. RCA Access Controls and Radworker Instructions
7. Conduct of Radiological Surveys
8. Radioactive Source Inventory and Control
9. Declared Pregnant Worker Program

F List of corrective action documents (including corporate and subtiered systems) written since April 26, 2010, associated with Radiological hazard assessment including, but not limited to:

1. Control of access to radiologically controlled areas
2. Electronic dosimeter alarms
3. Locked high radiation area key control
4. Radiological area posting

NOTE; The lists should indicate the <u>significance level</u> of each issue and the <u>search criteria</u> used. Please provide documents which are "searchable."

If not covered above, a summary of corrective action documents since (date)involving unmonitored releases, unplanned releases, or releases in which any dose limit or administrative dose limit was exceeded (for Public Radiation Safety Performance Indicator verification in accordance with of IP 71151)

G List of radiologically significant work activities scheduled to be conducted during the inspection period. (If the inspection is scheduled during an outage, please also include a list of work activities greater than 1 rem, scheduled during the outage with the dose estimate for the work activity.)

H List of active radiation work permits and the corresponding dose estimate

I Radioactive source inventory list

2. Occupational ALARA Planning and Controls (71124.02)

NOTE: In an effort to keep the requested information organized, please submit this information to us using the same lettering system below. For example, all contacts and phone numbers for the above inspector should be in a file/folder titled 2- A, Applicable organization charts in file/folder 2- B, etc.

List of contacts and telephone numbers for ALARA program personnel, if not included in 1.A.

B. Applicable organization charts, if different from that provided in 1.B.

C. Copies of audits, self-assessments, and LERs, written since April 26, 2010, focusing on ALARA, if different from 1.C.

D. Procedure index for ALARA Program, if different from that provided in 1.D.

E. Please provide specific procedures related to the following areas. Additional Specific Procedures may be requested by number after the inspector reviews the procedure indexes.

1 ALARA Program
2 ALARA Committee
3 Radiation Work Permit Preparation

F. A summary list of corrective action documents (including corporate and subtiered systems) written since April 26, 2010, related to the ALARA program. In addition to

ALARA, the summary should also address Radiation Work Permit violations, Electronic Dosimeter Alarms, and RWP Dose Estimates, if not addressed in 1.F.

NOTE; The lists should indicate the significance level of each issue and the search criteria used. Please provide documents which are "searchable."

List of work activities greater than 1 rem, from April 1, 2010

Include original dose estimate and actual dose.

H. Site dose totals and 3-year rolling averages for the past 3 years (based on dose of record)

I Outline of source term reduction strategy