



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION IV  
1600 E. LAMAR BLVD.  
ARLINGTON, TX 76011-4511

October 29, 2014

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

**SUBJECT: CALLAWAY PLANT – NRC INEGRATED INSPECTION  
REPORT 05000483/2014004**

Dear Mr. Diya,

On September 19, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Callaway Plant. On September 24, 2014, the NRC inspectors discussed the results of this inspection with Mr. B. Cox, Senior Director, Nuclear Operations, and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

NRC inspectors documented two findings of very low safety significance (Green) in this report. One finding involved a violation of NRC requirements. Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, U.S. 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 or a finding not associated with a regulatory requirement 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 Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible

F. Diya

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from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

***/RA/***

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

Docket Number: 50-483  
License Number: NPF-30

Enclosure:  
Inspection Report 05000483/2014004  
w/ Attachments:  
1. Supplemental Information  
2. Request for Information

cc w/ encl: Electronic Distribution

F. Diya

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from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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Letter to F. Diya from N. O'Keefe, dated October 29, 2014

SUBJECT: CALLAWAY PLANT – NRC INEGRATED INSPECTION  
REPORT 05000483/2014004

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Resident Inspector (Zachary.Hollcraft@nrc.gov)  
Branch Chief, DRP/B (Neil.OKeefe@nrc.gov)  
Senior Project Engineer, DRP/B (David.Proulx@nrc.gov)  
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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000483

License: NPF-30

Report: 05000483/2014004

Licensee: Union Electric Company

Facility: Callaway Plant

Location: Junction Highway CC and Highway O  
Steedman, MO

Dates: June 21 through September 19, 2014

Inspectors: T. Hartman, Senior Resident Inspector  
Z. Hollcraft, Resident Inspector  
G. Callaway, Senior Reactor Technology Instructor  
P. Elkmann, Senior Emergency Preparedness Inspector  
S. Garchow, Senior Operations Engineer  
G. Guerra, CHP, Emergency Preparedness Inspector  
P. Hernandez, Health Physicist  
M. Langelier, Project Engineer  
C. Peabody, Senior Resident Inspector, Wolf Creek  
D. Proulx, Senior Project Engineer  
L. Ricketson, P.E., Senior Health Physicist

Approved By: N. O'Keefe  
Chief, Project Branch B  
Division of Reactor Projects

## SUMMARY

IR 05000483/2014004; 06/21/2014 – 09/19/2014; Callaway Plant, Integrated Resident and Regional Report; Maintenance Effectiveness.

The inspection activities described in this report were performed between June 21 and September 19, 2014, by the resident inspectors at the Callaway Plant and inspectors from the NRC's Region IV office. Two findings of very low safety significance (Green) are documented in this report. One of these findings involved a violation of NRC requirements. The significance of inspection findings is indicated by their color (Green, White, Yellow, or Red), which is determined using Inspection Manual Chapter 0609, "Significance Determination Process." Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Components Within the Cross-Cutting Areas." Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

### Cornerstone: Initiating Events

- Green. The inspectors reviewed a self-revealing finding involving failure to verify the proper material was installed in the plant during a modification to the circulating water pumps. Specifically, Request for Resolution 201300416 specified the use of ASTM A276 410 stainless steel cap screws with a tensile strength around 186 ksi. Contrary to this, 410 stainless steel cap screws with a tensile strength between 201 ksi and 221 ksi were installed. Because the tensile strength was much higher, and thus more brittle and susceptible to stress corrosion, these cap screws were not appropriate for the application. This led to failure of the cap screws and the separation of the shaft coupling for circulating water pump B after less than one operating cycle in service, degrading condenser vacuum. The licensee removed the modification and installed the original type cap screws. This issue was entered into the licensee's corrective action program as Callaway Action Request 201404722.

The inspectors determined that failure to verify the correct materials were installed in the plant during a modification was a performance deficiency. This performance deficiency is more than minor because it is associated with the equipment performance attribute of the Initiating Events Cornerstone and affects the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as during power operations. Specifically, failure to install the correct material resulted in failure of circulating water pump B and degrading condenser vacuum. The inspectors evaluated the finding using NRC Inspection Manual 0609, Appendix A, Exhibit 1, "Initiating Event Screening Questions." The inspectors determined the finding was of very low safety significance (Green) because the transient initiator did not cause a reactor trip and the loss of mitigating equipment. This finding has an avoid complacency cross-cutting aspect within the human performance area because the licensee relied on the vendor to provide the correct material and did not verify the cap screws met the material specification [H.12]. (Section 1R12.2)

### Cornerstone: Mitigating Systems

- Green. The inspectors reviewed a self-revealing non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's

failure to perform nondestructive testing on portions of the essential service water system known to be susceptible to wall thinning in accordance with procedures. As a result, the licensee failed to identify wall thinning prior to developing a through-wall leak that rendered train A inoperable. Specifically, despite procedural guidance to the contrary, technicians only used the low frequency electromagnetic technique testing, which cannot monitor bends and portions of welds. They also failed to properly calibrate this equipment, and failed to perform ultrasonic testing on the portions of essential service water system that could not be properly monitored by use of low frequency electromagnetic technique. The resultant through-wall leaks were repaired according to ASME code standards. The licensee entered this issue into their corrective action program as Callaway Action Request 201405200 and planned to re-perform testing during the fall of 2014.

Failure to follow procedures while performing nondestructive testing on portions of the essential service water system was a performance deficiency. This performance deficiency is more than minor because it affected the equipment performance attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, failure to perform nondestructive testing on portions of the essential service water system that were known to be susceptible to wall thinning resulted in the failure to prevent a through-wall leak affecting the availability of a safety related system. Using NRC Inspection Manual 0609, Appendix A, "The Significance Determination Process for Findings At-Power," the finding was determined to be of very low safety significance because it only affected a single train, and resulted in a loss of function for less than its technical specifications allowed outage time. This finding has a procedure adherence cross-cutting aspect within the human performance area because the licensee failed to ensure that individuals followed processes, procedures, and work instructions. Specifically, licensee oversight failed to ensure that contractors followed specific guidance in their procedures for both ensuring that the low frequency electromagnetic technique tool was appropriately calibrated and areas unable to be scanned were tested utilizing ultrasonic testing [H.8]. (Section 1R12.1)

### **Licensee-Identified Violations**

A violation of very low safety significance that was identified by the licensee has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and associated corrective action tracking numbers are listed in Section 4OA7 of this report.

## PLANT STATUS

Callaway operated at or near 100 percent power for the duration of the inspection period with the exception of planned power reductions for routine surveillances and post-maintenance testing.

## REPORT DETAILS

### 1. REACTOR SAFETY

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

#### 1R04 Equipment Alignment (71111.04)

##### Partial Walkdown

##### a. Inspection Scope

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

- July 15, 2014, diesel-driven fire water pump train B
- August 6, 2014, essential service water train B
- August 21, 2014, diesel generator A during load shedding and emergency load sequencing train B testing
- August 21, 2014, Class 1E 4 kV distribution system train A during load shedding and emergency load sequencing train B testing

The inspectors reviewed the licensee's procedures and system design information to determine the correct lineup for the systems. They visually verified that critical portions of the trains were correctly aligned for the existing plant configuration.

These activities constituted four partial system walk-down samples as defined in Inspection Procedure 71111.04.

##### b. Findings

No findings were identified.

#### 1R05 Fire Protection (71111.05)

##### .1 Quarterly Inspection

##### a. Inspection Scope

The inspectors evaluated the licensee's fire protection program for operational status and material condition. The inspectors focused their inspection on five plant areas important to safety:



- July 25, 2014, auxiliary building elevation 1974', fire area A-1A
- August 14, 2014, fire water pump house 2000', fire area YD-1
- August 20, 2014, electrical penetration room A, fire area A-18
- August 20, 2014, electrical penetration room B, fire area A-17
- August 27, 2014, essential service water train A pump house, fire area S-10A

For each area, the inspectors evaluated the fire plan against defined hazards and defense-in-depth features in the licensee's fire protection program. The inspectors evaluated control of transient combustibles and ignition sources, fire detection and suppression systems, manual firefighting equipment and capability, passive fire protection features, and compensatory measures for degraded conditions.

These activities constituted five quarterly inspection samples, as defined in Inspection Procedure 71111.05.

b. Findings

No findings were identified.

.2 Annual Inspection

a. Inspection Scope

On August 11, 2014, the inspectors completed their annual evaluation of the licensee's fire brigade performance. This evaluation included observation of an unannounced fire drill for crew 5.

During this drill, the inspectors evaluated the capability of the fire brigade members, the leadership ability of the brigade leader, the brigade's use of turnout gear and fire-fighting equipment, and the effectiveness of the fire brigade's team operation. The inspectors also reviewed whether the licensee's fire brigade met NRC requirements for training, dedicated size and membership, and equipment.

These activities constituted one annual inspection sample, as defined in Inspection Procedure 71111.05.

b. Findings

No findings were identified.

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

a. Inspection Scope

On August 11, 2014, the inspectors completed an inspection of underground bunkers susceptible to flooding. The inspectors selected one underground bunker, essential service water train A cable bunker MH01A, that contained cables whose failure could disable risk-significant equipment.

The inspectors observed the material condition of the cables and splices contained in the bunkers and looked for evidence of cable degradation due to water intrusion. The inspectors verified that the cables and vaults met design requirements.

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

b. Findings

No findings were identified.

**1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11)**

.1 Review of Licensed Operator Requalification

a. Inspection Scope

On July 21, 2014, the inspectors observed an evaluated simulator scenario performed by an operating crew. The inspectors assessed the performance of the operators and the evaluators' critique of their performance. The inspectors also assessed the modeling and performance of the simulator during the requalification activities.

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 Review of Licensed Operator Performance

a. Inspection Scope

The inspectors observed the performance of on-shift licensed operators in the plant's main control room. At the time of the observations, the plant was in a period of heightened activity or risk. The inspectors observed the operators' performance of the following activities:

- July 17, 2014, control room response to failure of circulating water pump B and reduced condenser vacuum
- September 3, 2014, solid state protection system train A slave relay testing

In addition, the inspectors assessed the operators' adherence to plant procedures, including Procedure ODP-ZZ-00001, "Operations Department – Code of Conduct," and other operations department policies.

These activities constitute completion of one quarterly licensed operator performance sample, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

.3 Annual Review of Requalification Examination Results

a. Inspection Scope

The licensed operator requalification program involves two training cycles that are conducted over a two-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. For this annual inspection requirement, the licensee was in the first part of the training cycle.

The inspectors reviewed the results of the operating tests for the Callaway Plant to satisfy annual inspection requirements.

On September 9, 2014, the licensee informed the inspectors of the following results:

- 10 of 10 crews passed the simulator portion of the operating test
- 55 of 55 licensed operators passed the simulator portion of the operating test
- 55 of 55 licensed operators passed the job performance measure portion of the operating test

There were no remediations performed for the operating tests.

The inspectors completed one inspection sample of the annual licensed operator requalification program, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

**1R12 Maintenance Effectiveness (71111.12)**

a. Inspection Scope

The inspectors reviewed two instances of degraded performance or condition of safety-related structures, systems, and components:

- July 17, 2014, circulating water pump B coupling failure
- August 5, 2014, essential service water train A piping through-wall leak

The inspectors reviewed the extent of condition of possible common cause structure, system, and component failures and evaluated the adequacy of the licensee's corrective actions. The inspectors reviewed the licensee's work practices to evaluate whether these may have played a role in the degradation of the structures, systems and components. The inspectors assessed the licensee's characterization of the degradation in accordance with 10 CFR 50.65 (the Maintenance Rule), and verified that

the licensee was appropriately tracking degraded performance and conditions in accordance with the Maintenance Rule.

These activities constituted completion of two maintenance effectiveness samples, as defined in Inspection Procedure 71111.12.

b. Findings

1. Failure to Perform Nondestructive Testing on Essential Service Water Piping in Accordance with Procedures

Introduction. The inspectors reviewed a Green self-revealing non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to perform nondestructive testing on portions of essential service water system train A known to be susceptible to pipe wall thinning in accordance with procedures. Specifically, despite procedural guidance to the contrary, technicians failed to perform ultrasonic testing (UT) on essential service water piping during the performance of low frequency electromagnetic technique (LFET) testing; resulting in both an improperly calibrated probe and areas that were not properly scanned. Due to this, a below minimum wall thickness was not discovered and a through-wall leak later occurred on the essential service water pump A discharge line resulting in system unavailability.

Description. In April 2013, during a refueling outage, Callaway Plant conducted LFET testing on multiple pipes of both trains of essential service water. During this inspection, no indications of wall loss requiring follow-up UT were identified on the train A discharge piping.

On August 4, 2014, after a routine start of essential service water pump A, the licensee discovered a through-wall leak downstream of the pump discharge isolation valve. The system was declared inoperable and was drained. The extent of condition was evaluated by UT in accordance with ASME code requirements, and a second area with pipe wall thickness below minimum code requirements was found. Two 8-inch pipe caps were fabricated and welded over the flaws and system operability was restored on August 7. This issue and the corrective actions were documented in Callaway Action Request 201405138.

After the August 4 event, the licensee wrote Callaway Action Request 201405200 to document the fact that despite no wall thinning being reported in the testing completed the year before, a through-wall leak occurred. The contractor that performed the inspection explained that equipment limitations caused these areas to not be within the LFET inspection area. Also, they were under the impression that because they were not certified to Callaway's UT standards for quality nondestructive examination, they were not authorized to perform UT on the areas that were not scanned by LFET. The contractor stated that they believed other nondestructive examination inspectors would perform the UT that was directed by the Callaway work order. This was despite the fact that the contractor's LFET procedure directed that the technicians themselves perform UT as required. Licensee oversight was never notified that the contractor did not perform the UT analyses, and did not recognize that the completed test documents did not include the expected UT results; as a result Callaway personnel did not complete these inspections either. Upon completion of the LFET inspections, a report was

provided to the licensee but it was stored in the Raw Water Program Notebook without a formal acceptance review.

Callaway Procedure EDP-ZZ-01121, "Raw Water Systems Predictive Performance Program," step 4.1.1.c, states that "Ultrasonic Thickness (UT) measurements are taken in addition to LFET to confirm wall loss indications or areas that cannot be scanned with LFET." Also, the LFET probe must be calibrated to the pipe thickness by first performing UT on it to establish a baseline thickness. Since the contractor reported that no UT measurements were taken during the LFET testing, the licensee questioned the validity of all of the LFET data because the LFET probe may not have been calibrated correctly. As corrective actions for this issue, the licensee intends to re-perform the LFET testing during their subsequent refueling outage starting in October 2014.

Analysis. Failure to follow procedures while performing nondestructive testing on portions of the essential service water system was a performance deficiency. This performance deficiency is more than minor because it affected the equipment performance attribute of the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to perform nondestructive testing on portions of the essential service water system known to be susceptible to wall thinning resulted in the failure to prevent a through-wall leak affecting the availability of a safety related system. Using NRC Inspection Manual 0609, Appendix A, "The Significance Determination Process for Findings At-Power," the finding was determined to be of very low safety significance because it did not result in a loss of system function, did not represent a loss of function of a single train for greater than its technical specifications allowed outage time, and did not cause the loss of function of one or more non-technical specification trains of equipment designated as high safety-significance. This finding has a procedure adherence cross-cutting aspect within the human performance area because the licensee failed to ensure that individuals followed processes, procedures, and work instructions. Specifically, licensee oversight failed to ensure contractors followed specific guidance in their procedures for both ensuring that the LFET tool was appropriately calibrated and areas unable to be scanned were tested utilizing ultrasonic testing [H.8].

Enforcement. Title 10 of the *Code of Federal Regulations*, Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality 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, and drawings. Contrary to this requirement, the licensee failed to ensure an activity affecting quality was performed in accordance with procedure. Specifically, Callaway Procedure EDP-ZZ-01121, "Raw Water Systems Predictive Performance Program," step 4.1.1.C, states that ultrasonic thickness measurements shall be taken to confirm wall loss indications or areas that cannot be scanned with LFET. However, contractors failed to perform UT on areas that were not scanned with LFET, and also failed to properly calibrate the LFET probe. Because this violation was determined to be of very low safety significance (Green) and was entered into the licensee's corrective action program as Callaway Action Request 201405200, this violation is being treated as a non-cited violation in accordance with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000483/2014004-01, "Failure to Perform Nondestructive Testing on Essential Service Water Piping in Accordance with Procedures."

## .2 Failure to Verify Material Properties Prior to Installation

Introduction. The inspectors reviewed a Green self-revealing finding involving failure to verify the proper material was installed in the plant during a modification to the circulating water pumps.

Description. On July 17, 2014, the operating crew detected a degrading condenser vacuum. The operating crew determined that circulating water pump B was running with significantly reduced amperage. When circulating water pump B was removed from service, condenser vacuum returned to normal. Follow-up investigation by the licensee determined the pump had become separated from the motor due to a shaft coupling failure. The actual failure was a result of the cap screws that hold the coupling together failing.

Starting in March 1997, the licensee conducted a modification to replace the sleeve coupling with an axially split coupling on each of the circulating water pump shafts. Circulating water pump A was modified in March 1997, pump B was modified in January 2004, and pump C was modified in October 2005. The axially split shaft coupling was held together by A574 nickel-plated alloy steel cap screws. In December 2012, circulating water pump A failed due to coupling issues and it was determined the nickel-plated cap screws were susceptible to general corrosion. The licensee decided an alternative cap screw was needed. They repaired the pump A coupling using new nickel-plated cap screws while they found an alternative.

In March 2013, while circulating water pump B was out of service for overhaul, it was decided to replace the nickel-plated cap screws with different cap screws. The vendor was contacted and four options were presented to the licensee: a double nickel-plated A574 cap screw, a 410 stainless steel cap screw, and two different precipitation-hardened stainless steel options. The licensee stated that the double nickel-plated cap screws would take too long to fabricate and the precipitation-hardened cap screws would not be appropriate because of the increased susceptibility to stress corrosion cracking because the cooling water had a high concentration of chlorides, so they chose the 410 stainless steel option. Request for Resolution 201300416 determined that ASTM A276 410 stainless steel heat-treated cap screws with a yield strength of 140 ksi and a tensile strength of 186 ksi were required. This was because the composition of the cap screws would then be similar to the composition of the coupling and would be less susceptible to galvanic corrosion. Even though this metal is susceptible to stress corrosion cracking, they had success with this metal as part of the coupling and determined it would work best.

After the circulating water pump failed in 2014, the licensee determined that the cap screws provided by the vendor had been over hardened and failed due to stress corrosion cracking. It was determined that the cap screws installed had a tensile strength of between 201 ksi and 221 ksi, which is significantly higher than the requested 186 ksi. Because of this, the material was more brittle and more susceptible to stress corrosion cracking than the material that was specified. Additionally, it was determined that the licensee does not have a process or requirement to verify that material with critical characteristics, such as yield or tensile strength specifications, that is used in nonsafety-related applications is verified prior to use.

Analysis. The inspectors determined that failure to verify that the correct materials were installed in the plant during a modification was a performance deficiency. Request for Resolution 201300416 specified ASTM A276 410 stainless steel heat-treated cap screws with a yield strength of 140 ksi and a tensile strength of 186 ksi was required. Contrary to this, 410 stainless steel heat-treated cap screws with a tensile strength between 201 ksi and 221 ksi were installed without verifying that the correct material was being used. Because the tensile strength was much higher, and thus more brittle and susceptible to stress corrosion, these cap screws were not appropriate for the application.

The inspectors evaluated the performance deficiency in accordance with Inspection Manual Chapter 0612, Appendix B, "Issue Screening." This performance deficiency is more than minor because it is associated with the equipment performance attribute of the Initiating Events Cornerstone and adversely affects the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, failure to verify the material properties prior to installation resulted in failure of circulating water pump B and degrading condenser vacuum, necessitating operator action to ensure plant stability. The inspectors evaluated the finding using NRC Inspection Manual 0609, Appendix A, Exhibit 1, "Initiating Event Screening Questions." The inspectors determined the finding is of very low safety significance (Green) because the transient initiator did not cause a reactor trip and the loss of mitigating equipment.

This finding has an avoid complacency cross-cutting aspect within the human performance area because the licensee relied on the vendor to provide the correct material and did not verify the cap screws met the material specification [H.12].

Enforcement. This finding does not involve enforcement action because no violation of a regulatory requirement was identified. This issue was entered into the licensee's corrective action program as Callaway Action Request 201404722. Because this finding does not involve a violation and is of very low safety significance, it is identified as FIN 05000483/2014004-02, "Failure to Verify Material Properties Prior to Installation."

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

### **a. Inspection Scope**

The inspectors reviewed two risk assessments performed by the licensee prior to changes in plant configuration and the risk management actions taken by the licensee in response to elevated risk:

- July 21, 2014, yellow risk due to turbine-driven auxiliary feedwater pump maintenance
- August 12, 2014, fire water tank A maintenance

The inspectors verified that these risk assessments were performed timely and in accordance with the requirements of 10 CFR 50.65 (the Maintenance Rule) and plant procedures. The inspectors reviewed the accuracy and completeness of the licensee's risk assessments and verified that the licensee implemented appropriate risk management actions based on the result of the assessments.

The inspectors also observed portions of three emergent work activities that had the potential to cause an initiating event, to affect the functional capability of mitigating systems, or to impact barrier integrity:

- July 8, 2014, spent fuel building monorail hoist failure while receiving new fuel
- July 15, 2014, emergency diesel generator B compressor D pressure switch out of calibration
- August 6, 2014, essential service water train A through-wall pipe leak

The inspectors verified that the licensee appropriately developed and followed a work plan for these activities. The inspectors verified that the licensee took precautions to minimize the impact of the work activities on unaffected structures, systems, and components.

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

b. Findings

No findings were identified.

**1R15 Operability Determinations and Functionality Assessments (71111.15)**

a. Inspection Scope

The inspectors reviewed seven operability determinations and functionality assessments that the licensee performed for degraded or nonconforming structures, systems, or components:

- June 25, 2014, operability determination of emergency diesel generator B starting air system A leak, Callaway Action Request 201404221
- July 9, 2014, functionality assessment of residual heat removal heat exchanger A room floor drain, Callaway Action Request 201404573
- July 10, 2014, updated operability evaluation of component cooling water pumps bearing dark oil, Callaway Action Request 201306459
- July 28, 2014, functionality assessment of firewater tank A dresser coupling failure, Callaway Action Request 201404981
- July 30, 2014, operability determination of centrifugal charging pump train A, Callaway Action Request 201404961
- August 6, 2014, operability determination of essential service water train B piping, Callaway Action Request 201405138
- August 28, 2014, functionality assessment of fire water storage tank A heater failure, Callaway Action Request 201405570



The inspectors reviewed the timeliness and technical adequacy of the licensee's evaluations. Where the licensee determined the degraded structure, system, or component to be operable or functional, the inspectors verified that the licensee's compensatory measures were appropriate to provide reasonable assurance of operability or functionality. The inspectors verified that the licensee had considered the effect of other degraded conditions on the operability or functionality of the degraded structure, system, or component.

In addition, the inspectors reviewed the conditions surrounding the firewater tank A coupling failure; it was reported to have involved overpressurizing the fire header, but the evaluation only covered the coupling. The inspectors reviewed the revised evaluation when the licensee issued Callaway Action Request 201405872.

These activities constitute completion of seven operability and functionality review samples, as defined in Inspection Procedure 71111.15.

b. Findings

No findings were identified.

**1R18 Plant Modifications (71111.18)**

a. Inspection Scope

The inspectors reviewed two permanent plant modifications that affected risk-significant structures, systems, and components:

- August 6, 2014, Modification Package 14-0020, essential service water train A through-wall leak caps
- August 14, 2014, Modification Package 13-0023, reactor coolant system makeup for beyond design basis external event

The inspectors reviewed the design and implementation of the modifications. The inspectors verified that work activities involved in implementing the modifications did not adversely impact operator actions that may be required in response to an emergency or other unplanned event. The inspectors verified that post-modification testing was adequate to establish the operability of the structures, systems, and components, as modified.

These activities constitute completion of two samples of permanent modifications, as defined in Inspection Procedure 71111.18.

b. Findings

No findings were identified.

## **1R19 Post-Maintenance Testing (71111.19)**

### a. Inspection Scope

The inspectors reviewed seven post-maintenance testing activities that affected risk-significant structures, systems, or components:

- July 9, 2014, component cooling water pump A, Job 13508832
- July 21, 2014, turbine-driven auxiliary feedwater pump, Job 14504437
- July 29, 2014, essential service water makeup valves to component cooling water train B, Jobs 07514164 and 07514165
- August 7, 2014, essential service water train A after pipe repair, Job 14003465
- August 15, 2014, safeguards switchgear 13.8 kV circuit breaker 52-1, Job 11503434
- September 10, 2014, motor-driven auxiliary feedwater pump A, Job 14506031
- September 18, 2014, containment spray pump B, Job 11514764

The inspectors reviewed licensing- and design-basis documents for the structures, systems, and components and the maintenance and post-maintenance test procedures. The inspectors observed the performance of the post-maintenance tests to verify that the licensee performed the tests in accordance with approved procedures, satisfied the established acceptance criteria, and restored the operability of the affected structures, systems, and components.

These activities constitute completion of seven post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

### b. Findings

No findings were identified.

## **1R20 Refueling and Other Outage Activities (71111.20)**

### a. Inspection Scope

The inspectors reviewed the Callaway outage schedule and staffing plans for Refueling Outage 20, scheduled to commence October 11, 2014, to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. In addition, the inspectors reviewed the new fuel receipt process for the upcoming outage.

These inspection efforts constituted elements of a refueling outage sample as defined in Inspection Procedure 71111.20-05 which will be counted at the conclusion of Refueling Outage 20.

b. Findings

No findings were identified.

**1R22 Surveillance Testing (71111.22)**

a. Inspection Scope

The inspectors observed seven risk-significant surveillance tests and reviewed test results to verify that these tests adequately demonstrated that the structures, systems, and components were capable of performing their safety functions:

In-service tests:

- August 26, 2014, essential service water pump B quarterly run

Other surveillance tests:

- June 5, 2014, containment cooler D thermal performance testing
- July 2, 2014, emergency diesel generator B slow start test
- July 30, 2014, safety injection slave relay testing
- August 5, 2014, moderator temperature coefficient determination
- August 18, 2014, turbine-driven auxiliary feedwater pump response time testing
- August 18, 2014, auxiliary feedwater actuation system train B slave relay test

The inspectors verified that these tests met technical specification requirements, that the licensee performed the tests in accordance with their procedures, and that the results of the test satisfied appropriate acceptance criteria. The inspectors verified that the licensee restored the operability of the affected structures, systems, and components following testing.

These activities constitute completion of seven surveillance testing inspection samples, as defined in Inspection Procedure 71111.22.

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

**1EP6 Drill Evaluation (71114.06)**

Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors observed an emergency preparedness drill on July 10, 2014, to verify the adequacy and capability of the licensee's assessment of drill performance. The inspectors reviewed the drill scenario, observed the drill from the Technical Support Center, and attended the post-drill critique. The inspectors verified that the licensee's emergency classifications, off-site notifications, and protective action recommendations were appropriate and timely. The inspectors verified that any emergency preparedness

weaknesses were appropriately identified by the licensee in the post-drill critique and entered into the corrective action program for resolution.

These activities constitute completion of one emergency preparedness drill observation sample, as defined in Inspection Procedure 71114.06.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstones: Occupational Radiation Safety and Public Radiation Safety**

**2RS2 Occupational ALARA Planning and Controls (71124.02)**

a. Inspection Scope

The inspectors assessed licensee performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). During the inspection, the inspectors interviewed licensee personnel and reviewed licensee performance in the following areas:

- 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/post-job 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

These activities constitute completion of one sample of occupational ALARA planning and controls as defined in Inspection Procedure 71124.02.

b. Findings

No findings were identified.

## 2RS4 Occupational Dose Assessment (71124.04)

### a. Inspection Scope

The inspectors evaluated the accuracy and operability of the licensee's personnel monitoring equipment, verified the accuracy and effectiveness of the licensee's methods for determining total effective dose equivalent, and verified that the licensee was appropriately monitoring occupational dose. The inspectors interviewed licensee personnel, walked down various portions of the plant, and reviewed licensee performance in the following areas:

- External dosimetry accreditation, storage, issue, use, and processing of active and passive dosimeters
- The technical competency and adequacy of the licensee's internal dosimetry program
- Adequacy of the dosimetry program for special dosimetry situations such as declared pregnant workers, multiple dosimetry placement, and neutron dose assessment
- Audits, self-assessments, and corrective action documents related to dose assessment since the last inspection

These activities constitute completion of one sample of occupational dose assessment as defined in Inspection Procedure 71124.04.

### b. Findings

No findings were identified.

## 4. OTHER ACTIVITIES

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

### 4OA1 Performance Indicator Verification (71151)

#### .1 Unplanned Scrams per 7000 Critical Hours (IE01)

##### a. Inspection Scope

The inspectors reviewed licensee event reports for the period of third quarter 2013 through second quarter 2014 to determine the number of scrams that occurred. The inspectors compared the number of scrams reported in these licensee event reports to the number reported for the performance indicator. Additionally, the inspectors sampled monthly operating logs to verify the number of critical hours during the period. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned scrams per 7000 critical hours performance indicator for Callaway Plant, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.2 Unplanned Power Changes per 7000 Critical Hours (IE03)

a. Inspection Scope

The inspectors reviewed operating logs and corrective action program records for the period of third quarter 2013 through second quarter 2014 to determine the number of unplanned power changes that occurred. The inspectors compared the number of unplanned power changes documented to the number reported for the performance indicator. Additionally, the inspectors sampled monthly operating logs to verify the number of critical hours during the period. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned power outages per 7000 critical hours performance indicator for Callaway Plant, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.3 Unplanned Scrams with Complications (IE04)

a. Inspection Scope

The inspectors reviewed the licensee's basis for including or excluding in this performance indicator each scram that occurred between third quarter 2013 and second quarter 2014. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constituted verification of the unplanned scrams with complications performance indicator for Callaway Plant, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

## **40A2 Problem Identification and Resolution (71152)**

### **.1 Routine Review**

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

Throughout the inspection period, the inspectors performed daily reviews of items entered into the licensee's corrective action program and periodically attended the licensee's condition report screening meetings. The inspectors verified that licensee personnel were identifying problems at an appropriate threshold and entering these problems into the corrective action program for resolution. The inspectors verified that the licensee developed and implemented corrective actions commensurate with the significance of the problems identified. The inspectors also reviewed the licensee's problem identification and resolution activities during the performance of the other inspection activities documented in this report.

#### **b. Findings**

No findings were identified.

### **.2 Annual Follow-up of Selected Issues**

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

The inspectors selected the following for an in-depth follow-up:

- April 12, 2014, Callaway Action Request 201402538 identified that the licensee may not be entering all applicable technical specification conditions when performing slave relay testing because not all impacted components are known

The inspectors selected this issue because failure to understand how components are affected by surveillance testing can challenge the licensee's ability to comply with their license. The inspectors assessed the licensee's problem identification threshold, cause analyses, extent of condition reviews, and compensatory actions. The inspectors verified that the licensee appropriately prioritized the planned corrective actions and that these actions were adequate to address the condition.

These activities constitute completion of one annual follow-up sample as defined in Inspection Procedure 71152.

#### **b. Findings**

No findings were identified.

## **40A6 Meetings, Including Exit**

### **Exit Meeting Summary**

On July 30, 2014, the inspectors conducted a telephonic exit meeting to present the results of the in-office inspection of changes to the licensee's radiological assessment program to Mr. L. Graessle, Senior Director, Operations Support, and other members of the licensee staff.

The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On August 29, 2014, the inspectors presented the radiation safety inspection results to Mr. F. Diya, Senior Vice President and Chief Nuclear Officer, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

The inspectors obtained the final annual cycle results and telephonically briefed Mr. M. Otten, Exam Writer, Operations Training, of the results of the licensed operator requalification program inspection on September 10, 2014. 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 September 24, 2014, the inspectors presented the resident inspection results to Mr. B. Cox, Senior Director, Nuclear Operations, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

#### **40A7 Licensee-Identified Violations**

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as a non-cited violation.

- The licensee dose assessment methods are inaccurate under some circumstances. Title 10 of the *Code of Federal Regulations*, Section 50.54(q)(2) requires, in part, that power reactor licensees follow and maintain the effectiveness of an emergency plan that meets the requirements of Appendix E to Part 50 and the standards of 10 CFR 50.47(b). Section 50.47(b)(9) requires that adequate systems, methods, and equipment for assessing the actual and potential offsite consequences of a radiological emergency condition are in use. Contrary to the above, between December 5, 2009, and April 23, 2014, Callaway Plant did not maintain the effectiveness of an emergency plan that fully met the standards of 10 CFR 50.47(b). Specifically, the licensee failed to maintain adequate systems, methods, and equipment for assessing the actual and potential offsite consequences of a radiological release to the environment. The licensee identified circumstances which could cause their dose assessment program to overestimate offsite doses by a factor of 24. This finding was assessed using Manual Chapter 0609, Appendix B, "Emergency Preparedness Significance Determination Process," and was determined to be of very low safety significance (Green). The finding was a failure to comply with NRC requirements, was not a loss of risk significant planning standard function, and was not a degraded planning standard function. The finding was determined not to degrade the planning standard function because the calculation was not inaccurate in its normal operating configuration, the circumstances in which the inaccurate calculation would be used were rare, a method existed for the operator to correct the error, and because the error could be readily detected from examination of the dose assessment report. The issue was entered into the licensee's corrective action program as Corrective Action Request 201402814.



## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

K. Gilliam, Supervisor, Radiation Protection  
L. Graessle, Senior Director, Operations Support  
C. Graham II, Consulting Health Physicist, Radiation Protection  
M. Hoehn II, Supervising Engineer, Engineering Programs  
B. Huhmann, Supervising Engineer, Mechanical/Civil Design  
S. Maglio, Manager, Regulatory Affairs  
V. Miller, Supervisor, Radiation Protection  
P. McKenna, Manager, Emergency Preparedness  
M. Otten, Exam Writer, Operations Training  
S. Petzel, Engineer, Regulatory Affairs/Licensing  
C. Smith, Manager, Radiation Protection  
D. Thompson, Senior Health Physicist, Radiation Protection  
T. Trent, Senior Health Physicist, Radiation Protection  
E. Vaughn, Engineer, Mechanical/Civil Design  
T. Witt, Engineer, Regulatory Affairs/Licensing

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

#### **Opened and Closed**

05000483/2014004-01	NCV	Failure to Perform Nondestructive Testing on Essential Service Water Piping in Accordance with Procedures (Section 1R12.1)
05000483/2014004-02	FIN	Failure to Verify Material Properties Prior to Installation (Section 1R12.2)

### **LIST OF DOCUMENTS REVIEWED**

#### **Section 1R04: Equipment Alignment**

##### **Procedures**

<b><u>Number</u></b>	<b><u>Title</u></b>	<b><u>Revision</u></b>
ISL-NF-NB02B	NB02 Degraded and UV to LSELS Channel II	24
OSP-KC-00005, Checklist 1	Fire Pumphouse (KC) Valve Lineup	11

##### **Drawings**

<b><u>Number</u></b>	<b><u>Title</u></b>	<b><u>Revision</u></b>
8600-X-89634	Piping & Instrumentation Diagram Diesel Driven Fire Pump PKC1002A Fire Protection System	7
8600-X-89635	Piping & Instrumentation Diagram Diesel Driven Fire Pump PKC1002B Fire Protection System	7

## Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
8600-X-89637	Piping & Instrumentation Diagram Pump PKC1003, Air Compressor CKC1001, and Accumulator TKC1002 Fire Protection System	10
8600-X-89638	Piping & Instrumentation Diagram Yard Fire Loop Fire Protection System	6

## **Section 1R05: Fire Protection**

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-00703	Fire Protection Operability Criteria and Surveillance Requirements	24
FPP-ZZ-00007, Attachment 9	Pre-Plan/Fire Area #YD-1, Fire Pumphouse 2000' Elevation	14
MDP-ZZ-0STOR	Staging and Storage of Materials, Equipment and Tools within the Switchyard, Under the Electric Distribution Lines, Protected Area, Alternate Energy Power System (AEPS) and Power Block	15
OTO-KC-00001	Fire Response	11
OTO-KC-00001, ADD A-1	Auxiliary Building 1974' - General Area	0
OTO-KC-00001, ADD A-17	Auxiliary Building 2026' - South Electrical Penetration Room	0
OTO-KC-00001, ADD A-18	Auxiliary Building 2026' - North Electrical Penetration Room	0
	Fire Preplan Manual	38

### Callaway Action Requests

201307198      201400596      201402793      201404685

### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u> <u>Date</u>
Calculation KC-97	Fire Safety Analysis, Fire Area A-17	1
Calculation KC-98	Fire Safety Analysis, Fire Area A-18	1
	Drill Planning and Authorization – Fire Brigade Drill 14-2	July 3, 2014

## **Section 1R06: Flood Protection Measures**

### Callaway Action Requests

201401585          201405266

### Jobs

14501890

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

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
ISF-SB-0A30A	Solid State Protection System Train A Slave Relay K624, K626, K604, K711, and K743 Test	37
ODP-ZZ-00001	Operations Department – Code of Conduct	90
OTN-DA-00001	Circulating Water System	33
OTO-AD-00001	Loss of Condenser Vacuum	30

### Callaway Action Requests

201404722

### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
T61.0810 8	Dynamic Simulator Exam Scenario – Cycle 14-4 As Found	June 13, 2014
	Annual Operating Test Results	September 9, 2014

## **Section 1R12: Maintenance Effectiveness**

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EDP-ZZ-01128	Maintenance Rule Program	23
EDP-ZZ-01128, Appendix 1	SSCs in the Scope of the Maintenance Rule at Callaway	9
EDP-ZZ-01128, Appendix 2	Summary of SSC Performance Criteria	26
EDP-ZZ-01128, Appendix 4	Maintenance Rule System Functions	14
EDP-ZZ-01121	Raw Water Systems Predictive Performance Program	17

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EDP-ZZ-04015	Evaluating and Processing Requests for Resolution (RFR)	60
EDP-ZZ-04015	Evaluating and Processing Requests for Resolution (RFR)	66
NPS-Proc 007	Nondestructive Examination Procedure, Examination for the Detection and Sizing of Pitting, Corrosion, and Wall Loss Using Low Frequency Electromagnetic Techniques	2

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-U2EF01	Piping & Instrument Diagram – Essential Service Water System	65

Callaway Action Requests

201404722	201302158	201208782	201405138	201405200
201300416	201405034			

Jobs

14003465	11007688	11007689	11007690	11007691
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Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
RFR 16884	Install Split Couplings on the Circ Water Pumps	May 8, 1996
T-13115-LF	Low Frequency Electromagnetic Technique Inspection Report of the EF-001-HBC 30" Line at Ameren Callaway Plant in Fulton, MO by Testex, Inc.	June 26, 2013

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-00703	Fire Protection Operability Criteria and Surveillance Requirements	24
ODP-ZZ-00002, Appendix 1	Protected Equipment Program	20
ODP-ZZ-00002, Appendix 2	Risk Management Actions for Planned Risk Significant Activities	8

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
ODP-ZZ-00002, Appendix 2 CL 2	Door Postings for A Train ESW and/or Emergency Diesel Generator being Out of Service	2
ODP-ZZ-00002, Appendix 2 CL 5	Door Postings for Turbine Driven Auxiliary Feedwater Pump (PAL02) being Out of Service	1

### Callaway Action Requests

201404558          20104656          201405138

### Jobs

13005379          14003108          06113184          14003465

## **Section 1R15: Operability Evaluations**

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-00500, Appendix 1	Operability and Functionality Determinations	22
APA-ZZ-00500, Appendix 1	Operability and Functionality Determinations	23
APA-ZZ-00703	Fire Protection Operability Criteria and Surveillance Requirements	24

### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
8600-X-88305	Piping Plan – Storage Tank Area, Fire Protection System	14
8600-X-89633	Piping & Instrument Diagram – Firewater Makeup Pump PKC1004 & Storage Tanks TKC1001A & B, Fire Protection System (KC1)	15
8600-X-89636	Piping & Instrument Diagram – Fire Pump PKC1001A & Freeze Protection Pumps PKC1005A & B, Fire Protection System (KC1)	9

### Callaway Action Requests

201306459          201404573          201405570          201404961          201404221  
201404656          201404981          201405138

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
O120.0015	Night Order: CAR 201404221 B EDG Starting Air System Air Leak	1

**Section 1R18: Plant Modifications**

Callaway Action Requests

201405322	201405138	201405167
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Jobs

14003465

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EF-108	Design and Evaluation of a Leak Repair for Line EF-003-HBC-30	0
MP 13-0023	Reactor Coolant System Makeup for BDBEE	0
MP 14-0020	Repair Leakage On Line EF-003-HBC-30	0

**Section 1R19: Post-Maintenance Testing**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-00100	Written Instructions Use and Adherence	30
MPE-ZZ-QY054	Inspection and Test of Protective Lockout Relay, General Electric Type HEA	5
MPM-ZZ-QA001	Limiterorque Actuator Inspection and Lubrication	43
OSP-AL-P0002	Turbine Driven Auxiliary Feedwater Pump Inservice Test – Group B	73
OSP-EG-PV01A	Component Cooling Water Train A Pump and Valve IST Comprehensive Test	5
OSP-EG-V001B	Component Cooling Water Train B Valve Inservice Inspection Test	42
OSP-EG-P01AC	Component Cooling Water Train A Pump and Valve Inservice Test – Group A	31
OTN-EG-00001	Component Cooling Water System	57
OTS-MD-00003	Fast Transfer of XB01 Power Supply in Modes 1 through 4	15

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OSP-AL-P001A	Motor Driven Auxiliary Feedwater Pump A Inservice Test – Group A	61
OSP-AL-V001A	Train A Auxiliary Feedwater Valve Inservice Test	51
OTN-EF-00001	Essential Service Water System	67
QCP-ZZ-05041	Visual Examination to ASME VT-2	26
OSP-EN-P001B	Train B Containment Spray Pump Inservice Test	44

Callaway Action Requests

201405138          201405200

Jobs

07514164	07514165	11503434	13508832	13509837
13509840	13509926	14503913	10514876	09500404
09501160	13511690	11514532	14506031	14003465
11514764	14000698			

**Section 1R20: Refueling and Other Outage Activities**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-00802	Confined Space Program	18
APA-ZZ-00802, Appendix 1	Callaway Plant Confined Space Listing	4
ETP-ZZ-00003	Inspection of New Fuel	17
OSP-KE-00003	Cask Handling Crane Bridge and Trolley Travel Limit Verification	18
OTS-KE-00003	Unloading and Storage of New Fuel Assemblies and Inserts	31
OTS-KE-00004	Operation of the New Fuel Handling Tool	10
OTS-KE-00016	Operation of the Cask Handling Crane	19
OTS-KE-00005	Operation of the New Fuel Elevator	13

Callaway Action Requests

201404098

Jobs

13500018            12513737

Miscellaneous

Title

Date

Refuel 20, Revision 0, Critical Path Schedule

August 28, 2014

Callaway Refueling Outage 20 – Overview

September 18, 2014

Refuel 20 Weekly Status Report

September 18, 2014

**Section 1R22: Surveillance Testing**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
ESP-ZZ-00010	At-Power Moderator Temperature Coefficient Measurement	24
ISP-SA-00006	Response Time Test for Channel IV Loss of Power Start of TDAFP Logic	6
OSP-NE-0001B	Standby Diesel Generator B Periodic Tests	59
OSP-EF-P001B	Essential Service Water Train B Inservice Test	69
OSP-SA-0007B	Train B Auxiliary Feed Actuation System Slave Relay Test	31
OSP-SA-0014A	Train A Safety Injection System Slave Relay Test	13
OSP-SA-0014B	Train B Safety Injection System Slave Relay Test	13
OSP-SA-0015A	Train A Safety Injection System Slave Relay Test	19
OSP-SA-0015B	Train B Safety Injection System Slave Relay Test	19

Jobs

13501163            14504702            14504703            14505723

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E170.0130	Callaway Cycle 20 Core Operating Limits Report	2
14-103	Callaway Nuclear Plant Containment Fan Coil Unit SGN01D June 2014 Thermal Performance Test Report	0



## Section 1EP6: Drill Evaluation

### Callaway Action Requests

201404689	201404717	201404719	201404826
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### Miscellaneous

#### Title

Emergency Preparedness Team Drill

#### Date

July 10, 2014

## Section 2RS02: Occupational ALARA Planning and Controls

### Audits, Self-Assessments, and Surveillances

#### Number

#### Title

#### Date

201309684	STARS Radiation Protection Fundamentals Self-Assessment	June 23, 2014
OQC 14	Nuclear Oversight Performance Report	January 27, 2014

### Procedures

#### Number

#### Title

#### Revision

APA-ZZ-01001	Callaway Plant ALARA Program	19
HDP-ZZ-01100	ALARA Planning and Review	16
HDP-ZZ-01200	Radiation Work Permits	24
HTP-ZZ-06009	Personnel Contamination Assessment and Decontamination	45

### Callaway Action Requests

201402852	201401725	201305808	201309012	201303308
201308595	201302818	201305916	201309071	201303498
201308860	201302955	201306561	201400758	201305847
201403349	201302963	201306689	201400763	201401142
201306565	201303275	201308746	201401522	201401815
201309318	201303605	201308737	201404569	201303185
201303856	201305582	201308866	201303181	201306521

### Radiation Work Permits

#### Number

#### Title

#### Revision

390901SIINSUL	Engineering ISI Insulation Tasks in all Areas of the RCA Including Reactor Building	2
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Radiation Work Permits

<u>Number</u>	<u>Title</u>	<u>Revision</u>
350101RPJOB COV	Refuel 19 Radiation Protection Job Coverage and Surveys	0
190806302	Inspect, Remove, Reinstall CRDM Ventilation Ductwork	1
190813187	Install Stud Tensioner Hoists, Detention Reactor Vessel Studs	1
190813190	Final Reactor Vessel Head Set	4

Miscellaneous

<u>Title</u>	<u>Revision/Date</u>
Callaway Energy Center Long Range Dose and Source Term Reduction Plan	6
Refuel 19 Outage ALARA Report	May 28, 2013

**Section 2RS04: Occupational Dose Assessment**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-01000	Callaway Energy Center Radiation Protection Program	38
HDP-ZZ-01300	Internal Dosimetry Program	32
HDP-ZZ-03000, Appendix D	Performing Airborne Radioactivity Surveys	9

Callaway Action Requests

201301109      201302133

Radiation Work Permits

<u>Number</u>	<u>Title</u>
13004550500	Demobilize Ultrasonic Fuel Cleaning Machine

Desk Top Guides

<u>Number</u>	<u>Title</u>	<u>Revision</u>
HTP-ZZ-01302-DTI-DPW	Response to Positive In Vivo Count for Declared Pregnant Woman	5
HTP-ZZ-01302-DTI- ROUTINE/DIAG	Response to Positive Routine or Diagnostic In Vivo Count	15

### Desk Top Guides

<u>Number</u>	<u>Title</u>	<u>Revision</u>
HTP-ZZ-01302-DTI-TERMINATIONS	Response to Positive Termination In Vivo Count	17
HTP-ZZ-01320-DTI-INITIAL DOSE	Initial Assessment of Internal Dose Equivalent	11
HTP-ZZ-01490	Determination of Beta Skin Dose	34
RP-DTI-Air Sample Dose	Intake Assessment from Air Samples	2

### **Section 40A1: Performance Indicator Verification**

#### Callaway Action Requests

201305943

#### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Callaway Control Room Logs	July 26, 2013 to July 27, 2013
G215.0001.001	NRC Performance Indicator Transmittal Report	October 7, 2013
G215.0001.001	NRC Performance Indicator Transmittal Report	January 9, 2014
G215.0001.001	NRC Performance Indicator Transmittal Report	April 10, 2014
G215.0001.001	NRC Performance Indicator Transmittal Report	July 3, 2014

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

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OSP-SA-0017A	Train A SIS-CSAS Slave Relay Test	32
OSP-SA-0017B	Train B SIS-CSAS Slave Relay Test	33

#### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E-23AE06	Schematic Diagram – Main Feedwater Control Valves	6

#### Callaway Action Requests

201402538

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

Procedures

Title

Root Cause Analysis AUCA 14-001

Date

May 21, 2014

Miscellaneous

Title

Licensee Presentation, MAGNEM Dose Assessment Software

Date

June 24, 2014

**The following items are requested for the  
Occupational Radiation Safety Inspection  
at Callaway Plant  
August 25 – 29, 2014  
Integrated Report 2014004**

Inspection areas are listed in the attachments below.

Please provide the requested information on or before August 4, 2014.

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.01 should be in a file/folder titled "1- A," applicable organization charts in file/folder "1- B," etc.

If information is placed on *ims.certrec.com*, please ensure the inspection exit date entered is at least 30 days later than the onsite inspection dates, so the inspectors will have access to the information while writing the report.

In addition to the corrective action document lists provided for each inspection procedure listed below, please provide updated lists of corrective action documents at the entrance meeting. The dates for these lists should range from the end dates of the original lists to the day of the entrance meeting.

If more than one inspection procedure is to be conducted and the information requests appear to be redundant, there is no need to provide duplicate copies. Enter a note explaining in which file the information can be found.

If you have any questions or comments, please contact Larry Ricketson at (817) 200-1165 or [Larry.Ricketson@nrc.gov](mailto:Larry.Ricketson@nrc.gov).

**PAPERWORK REDUCTION ACT STATEMENT**

This letter does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget, control number 3150-0011.

**2. Occupational ALARA Planning and Controls (71124.02)**

Date of Last Inspection: April 15, 2013

- A. List of contacts and telephone numbers for ALARA program personnel
- B. Applicable organization charts
- C. Copies of audits, self-assessments, and LERs, written since date of last inspection, focusing on ALARA
- D. Procedure index for ALARA Program
- E. Please provide specific procedures related to the following areas noted below. 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 date of last inspection, 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.

NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are “searchable” so that the inspector can perform word searches.

- G. List of work activities greater than 1 rem since date of last inspection  
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
- J. If available, provide a copy of the ALARA outage report for the *most recently* completed outages for each unit.
- K. Please provide your most recent Annual ALARA Report.

#### 4. Occupational Dose Assessment (Inspection Procedure 71124.04)

Date of Last Inspection: August 27, 2012

- A. List of contacts and telephone numbers for the following areas:  
Dose Assessment Personnel
- B. Applicable organization charts
- C. Audits, self-assessments, vendor or NUPIC audits of contractor support, and LERs written since date of last inspection, related to:  
Occupational Dose Assessment
- D. Procedure indexes for the following areas:  
Occupational Dose Assessment
- E. Please provide specific procedures related to the following areas noted below. Additional specific procedures will be requested by number after the inspector reviews the procedure indexes.
  - 1. Radiation Protection Program
  - 2. Radiation Protection Conduct of Operations
  - 3. Personnel Dosimetry Program
  - 4. Radiological Posting and Warning Devices
  - 5. Air Sample Analysis
  - 6. Performance of High Exposure Work
  - 7. Declared Pregnant Worker
  - 8. Bioassay Program
- F. List of corrective action documents (including corporate and subtiered systems) written since date of last inspection, associated with:
  - 1. National Voluntary Laboratory Accreditation Program (NVLAP)
  - 2. Dosimetry (TLD/OSL, etc.) problems
  - 3. Electronic alarming dosimeters
  - 4. Bioassays or internally deposited radionuclides or internal dose
  - 5. Neutron dose

NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are “searchable” so that the inspector can perform word searches.
- G. List of positive whole body counts since date of last inspection, names redacted if desired
- H. Part 61 analyses/scaling factors
- I. The most recent National Voluntary Laboratory Accreditation Program (NVLAP) accreditation report or, if dosimetry is provided by a vendor, the vendor’s most recent results