



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION IV  
1600 E. LAMAR BLVD.  
ARLINGTON, TX 76011-4511

January 25, 2017

Mr. Fadi Diya, Senior Vice President  
and Chief Nuclear Officer  
Ameren Missouri  
Callaway Plant  
P.O. 620  
Fulton, MO 65251

SUBJECT: CALLAWAY PLANT – NRC INTEGRATED INSPECTION  
REPORT 05000483/2016004

Dear Mr. Diya,

On December 31, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Callaway Plant. On January 4, 2017, the NRC inspectors discussed the results of this inspection with you and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

No NRC-identified or self-revealing findings were identified during this inspection. However, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the 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.

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 made available electronically for public inspection in the NRC's Public Document Room or the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

To the extent possible, your response, if any, should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

Sincerely,

*/RA/*

Nicholas H. Taylor, Branch Chief  
Project Branch B  
Division of Reactor Projects

Docket No. 50-483  
License No. NPF-30

Enclosure:  
Inspection Report 05000483/2016004  
w/ Attachment 1: Supplemental Information  
Attachment 2: Request for Information

CALLAWAY PLANT – NRC INTEGRATED INSPECTION REPORT 05000483/2016004  
 DATED JANUARY 25, 2017

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000483

License: NPF-30

Report: 05000483/2016004

Licensee: Union Electric Company

Facility: Callaway Plant

Location: Junction Highway CC and Highway O  
Steedman, MO

Dates: October 1 through December 31, 2016

Inspectors: T. Hartman, Senior Resident Inspector  
M. Langelier, Resident Inspector  
M. Stafford, Acting Resident Inspector  
P. Elkmann, Senior Emergency Preparedness Inspector  
S. Graves, Senior Reactor Inspector, Engineering Branch 2  
S. Money, Health Physicist  
M. Phalen, Senior Health Physicist

Approved By: Nicholas H. Taylor  
Chief, Project Branch B  
Division of Reactor Projects

Enclosure

## **SUMMARY**

IR 05000483/2016004; 10/01/16 - 12/31/16; Callaway Plant, Integrated Inspection Report

The inspection activities described in this report were performed between October 1 and December 31, 2016, by the resident inspectors at the Callaway Plant and inspectors from the NRC's Region IV office. The significance of inspection findings is indicated by their color (i.e., Green, greater than Green, White, Yellow, or Red), determined using Inspection Manual Chapter 0609, "Significance Determination Process," dated April 29, 2015. Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. 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," dated July 2016.

### **Licensee-Identified Violations**

A violation of very low safety significance was identified by the licensee and 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 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

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

##### Readiness for Seasonal Extreme Weather Conditions – Cold Weather Preparations

##### a. Inspection Scope

On December 12, 2016, the inspectors completed an inspection of the station's readiness for seasonal extreme weather conditions. The inspectors reviewed the licensee's adverse weather procedures for cold weather and evaluated the licensee's implementation of these procedures. The inspectors verified that prior to the onset of cold weather, the licensee had corrected or plans to correct weather-related equipment deficiencies identified during the previous cold weather season.

The inspectors selected the condensate storage tank and hardened condensate storage tank as risk-significant systems that were required to be protected from cold weather.

The inspectors reviewed the licensee's procedures and design information to ensure the systems would remain functional when challenged by cold weather. The inspectors verified that operator actions described in the licensee's procedures were adequate to maintain readiness of these systems. The inspectors walked down portions of these systems to verify the physical condition of the cold weather protection features.

These activities constituted one sample of readiness for seasonal adverse weather, as defined in Inspection Procedure 71111.01.

##### b. Findings

No findings were identified.

#### 1R04 Equipment Alignment (71111.04)

##### Partial Walk-Down

##### a. Inspection Scope

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

- October 6, 2016, train B motor-driven auxiliary feed system
- October 26, 2016, train A class 1E switchgear

- December 4, 2016, train B emergency exhaust system
- December 23, 2016, train A component cooling water

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)**

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:

- November 8, 2016, train A switchgear room, area C-9
- November 8, 2016, train B switchgear room, area C-10
- November 15, 2016, train A emergency core cooling rooms, area A-2
- November 15, 2016, train B emergency core cooling rooms, area A-4
- December 1, 2016, train A class 1E air conditioning equipment room, area C-14

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.

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

### .1 Review of Licensed Operator Requalification

#### a. Inspection Scope

On October 17, 2016, 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 scenario.

These activities constituted 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. The inspectors observed the operators' performance of the following activities:

- November 3, 2016, shift turnover and train B emergency diesel generator surveillance testing
- December 23, 2016, shift turnover

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

#### b. Findings

No findings were identified.



## **1R12 Maintenance Effectiveness (71111.12)**

### **.1 Routine Maintenance Effectiveness**

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

On October 27, 2016, the inspectors reviewed door DSK 31011 for instances of degraded performance or conditions on safety-related structures, systems, and components.

The inspectors reviewed the extent of condition of possible common cause structure, system, or 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 one maintenance effectiveness sample as defined in Inspection Procedure 71111.12.

#### **b. Findings**

No findings were identified.

### **.2 Quality Control**

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

On December 21, 2016, the inspectors reviewed the licensee's dedication of commercial grade snubbers for use in safety-related applications.

These activities constituted completion of one quality control sample, as defined in Inspection Procedure 71111.12.

#### **b. Findings**

No findings were identified.

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

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

The inspectors reviewed three 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:

- October 10, 2016, planned maintenance on train A residual heat removal pump room cooler and train A safety injection pump

- October 20, 2016, red light socket replacement for BGHIS8149CA, Job 13007136
- November 28, 2016, train B spent fuel pool pump room cooler replacement while being the protected train

The inspectors verified that these risk assessment 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.

These activities constituted completion of three 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 five operability determinations that the licensee performed for degraded or nonconforming structures, systems, or components:

- July 27, 2016, train B emergency diesel generator #14 fuel injector pump stuck full open
- October 11, 2016, functionality assessment of door to train B safety injection pump room impaired for train B safety injection pump room cooler replacement
- November 17, 2016, train B cooling tower bypass valve did not fully close
- December 19, 2016, train A control room pressurization system ducting missing a plug
- December 22, 2016, steam generator C main feedwater regulating valve bypass valve hunting while in the full open position

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

These activities constituted completion of five operability and functionality review sample as defined in Inspection Procedure 71111.15.

b. Findings

No findings were identified.

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

a. Inspection Scope

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

- October 5, 2016, SLG10A, train A residual heat removal pump room cooler
- November 9, 2016, PKJ01B, train B emergency diesel jacket water keep warm pump
- November 15, 2016, train B emergency diesel generator supply fan
- November 17, 2016, train B cooling tower bypass valve
- November 29, 2016, C atmospheric steam dump

The inspectors reviewed licensing- and design-basis documents for the structures, systems, or 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, or components.

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

b. Findings

One licensee-identified violation is documented in Section 4OA7.

**1R22 Surveillance Testing (71111.22)**

a. Inspection Scope

The inspectors observed four 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:

- December 20, 2016, train A safety injection pump in-service test

Containment isolation valve surveillance tests:

- December 23, 2016, containment isolation signal phase A slave relay test

Other surveillance tests:

- December 22, 2016, train A load shed and emergency load sequencing test

- December 27, 2016, train A safety injection signal 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 tests satisfied appropriate acceptance criteria. The inspectors verified that the licensee restored the operability of the affected structures, systems, or components following testing.

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

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

**1EP2 Alert and Notification System Evaluation (71114.02)**

a. Inspection Scope

The inspectors verified the adequacy of the licensee's methods for testing the primary and backup alert and notification system, and reviewed siren maintenance records for calendar years 2014, 2015, and 2016. The inspectors also reviewed the licensee's program for identifying emergency planning zone locations requiring tone alert radios and for distributing the radios, and reviewed audits of distribution records. The inspectors interviewed licensee personnel responsible for the maintenance of the primary and backup alert and notification system and reviewed a sample of corrective action system reports written for alert and notification system problems. The inspectors compared the licensee's alert and notification system testing program with criteria in NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1; FEMA Report REP-10, "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants," and the licensee's current FEMA-approved alert and notification system design report, "Callaway Plant Alert and Notification System Design Report," dated October 2014.

These activities constituted completion of one alert and notification system evaluation sample as defined in Inspection Procedure 71114.02.

b. Findings

No findings were identified.

**1EP3 Emergency Response Organization Staffing and Augmentation System (71114.03)**

a. Inspection Scope

The inspectors verified the licensee's emergency response organization on-shift and augmentation staffing levels were in accordance with the licensee's emergency plan commitments. The inspectors reviewed documentation and discussed with licensee staff the operability of primary and backup systems for augmenting the on-shift emergency

response staff to verify the adequacy of the licensee's methods for staffing emergency response facilities, including the licensee's ability to staff pre-planned alternate facilities. The inspectors also reviewed records of emergency response organization augmentation tests and events to determine whether the licensee had maintained a capability to staff emergency response facilities within emergency plan timeliness commitments.

These activities constitute completion of one emergency response organization staffing and augmentation testing sample as defined in Inspection Procedure 71114.03.

b. Findings

No findings were identified.

**1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)**

a. Inspection Scope

The inspectors performed an in-office review of Emergency Plan Implementing Procedure EIP-ZZ-00101, Addendum 2, "Emergency Action Level Technical Basis Document," Revision 11, implemented October 17, 2016. This revision added references to Technical Specification 3.4.16 to the basis description for emergency action level SU4.1, "Sample Analysis indicates RCS activity > Technical Specifications Section 3.4.16 Limits," and corrected minor spelling errors.

This revision was compared to its previous revision, to the criteria of NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, to Nuclear Energy Institute Report 99-01, "Emergency Action Level Methodology," Revision 5, and to the standards in 10 CFR 50.47(b) to determine if the revision adequately implemented the requirements of 10 CFR 50.54(q)(3) and 50.54(q)(4). The inspectors verified that the revision did not decrease the effectiveness of the emergency plan. This review was not documented in a safety evaluation report and did not constitute approval of licensee-generated changes; therefore, this revision is subject to future inspection.

These activities constitute completion of one emergency action level and emergency plan changes sample as defined in Inspection Procedure 71114.04.

b. Findings

No findings were identified.

**1EP5 Maintenance of Emergency Preparedness (71114.05)**

a. Inspection Scope

The inspectors reviewed the following for the period May 2014 through October 2016:

- After-action evaluation reports for licensee drills and exercises
- Independent audits and surveillances of the licensee's emergency preparedness program

- Self-assessments of the emergency preparedness program conducted by the licensee
- Licensee evaluations of changes made to the emergency plan and emergency plan implementing procedures
- Drill and exercise performance issues entered into the licensee's corrective action program
- Emergency preparedness program issues entered into the licensee's corrective action program
- Maintenance records for equipment supporting the emergency preparedness program
- Emergency response organization and emergency planner training records

The inspectors reviewed summaries of 344 corrective action program reports associated with emergency preparedness and selected 22 to review against program requirements, to determine the licensee's ability to identify, evaluate, and correct problems in accordance with planning standard 10 CFR 50.47(b)(14) and 10 CFR Part 50, Appendix E, IV.F. The inspectors verified that the licensee accurately and appropriately identified and corrected emergency preparedness weaknesses during critiques and assessments.

The inspectors reviewed summaries of 241 evaluations of the impact of changes to the emergency plan and implementing procedures and selected 12 to review against program requirements to determine the licensee's ability to identify reductions in the effectiveness of the emergency plan in accordance with the requirements of 10 CFR 50.54(q)(3) and 50.54(q)(4). The inspectors verified that evaluations of proposed changes to the licensee emergency plan appropriately identified the impact of the changes prior to being implemented.

The inspectors reviewed summaries of 235 records of preventative or periodic maintenance for equipment and facilities used to implement the emergency plan, and 190 records of emergent maintenance. The inspectors verified that equipment and facilities were maintained in accordance with the commitments of the licensee's emergency plan.

These activities constitute completion of one sample of the maintenance of the licensee's emergency preparedness program as defined in Inspection Procedure 71114.05.

b. Findings

No findings were identified.

## **1EP6 Drill Evaluation (71114.06)**

### Training Evolution Observation

#### a. Inspection Scope

On October 17, 2016, the inspectors observed simulator-based licensed operator requalification training that included implementation of the licensee's emergency plan. 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 evaluators and entered into the corrective action program for resolution.

These activities constituted completion of one training observation sample, as defined in Inspection Procedure 71114.06.

#### b. Findings

No findings were identified.

## **2. RADIATION SAFETY**

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

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

#### a. Inspection Scope

The inspectors assessed licensee performance with respect to maintaining individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors performed this portion of the attachment as a post-outage review. During the inspection the inspectors interviewed licensee personnel, reviewed licensee documents, and evaluated licensee performance in the following areas:

- Radiological work planning, including work activities of exposure significance, and radiological work planning ALARA evaluations, initial and revised exposure estimates, and exposure mitigation requirements. The inspectors also verified that the licensee's planning identified appropriate dose reduction techniques, reviewed any inconsistencies between intended and actual work activity doses, and determined if post-job (work activity) reviews were conducted to identify lessons learned.
- Verification of dose estimates and exposure tracking systems, including the basis for exposure estimates, and measures to track, trend, and if necessary reduce occupational doses for ongoing work activities. The inspectors evaluated the licensee's method for adjusting exposure estimates and reviewed the licensee's evaluations of inconsistent or incongruent results from the licensee's intended radiological outcomes.
- Problem identification and resolution for ALARA planning. The inspectors reviewed audits, self-assessments, and corrective action program documents to verify problems were being identified and properly addressed for resolution.

These activities constitute completion of two of the five required samples of occupational ALARA planning and controls program, 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:

- Source term characterization, including characterization of radiation types and energies, hard-to-detect isotopes, and scaling factors
- External dosimetry including National Voluntary Laboratory Accreditation Program (NVLAP) accreditation, storage, issue, use, and processing of active and passive dosimeters
- Internal dosimetry, including the licensee's use of whole body counting, use of in vitro bioassay methods, dose assessments based on airborne monitoring, and the adequacy of internal dose assessments
- Special dosimetric situations, including declared pregnant workers, dosimeter placement and assessment of effective dose equivalent for external exposures, shallow dose equivalent, and neutron dose assessment
- Problem identification and resolution for occupational dose assessment, the inspectors reviewed audits, self-assessments, and corrective action program documents to verify problems were being identified and properly addressed for resolution

These activities constitute completion of the five required samples of occupational dose assessment program, 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 Mitigating Systems Performance Index: High Pressure Injection Systems (MS07) and Mitigating Systems Performance Index: Residual Heat Removal Systems (MS09)

###### a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of fourth quarter 2015 through third quarter 2016 to verify the accuracy and completeness of the reported data. 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 reported data.

These activities constituted verification of the mitigating system performance index for high pressure injection systems and residual heat removal systems, as defined in Inspection Procedure 71151.

###### b. Findings

No findings were identified.

###### .2 Drill/Exercise Performance (EP01)

###### a. Inspection Scope

The inspectors reviewed the licensee's evaluated exercises and selected drills and exercises conducted between April 2014 and September 2016 to verify the accuracy of the licensee's data for classification, notification, and protective action recommendation opportunities. The inspectors reviewed a sample of the licensee's completed classifications, notifications, and protective action recommendations to verify their timeliness and accuracy. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data.

These activities constituted verification of the drill/exercise performance performance indicator as defined in Inspection Procedure 71151.

###### b. Findings

No findings were identified.

.3 Emergency Response Organization Drill Participation (EP02)

a. Inspection Scope

The inspectors reviewed the licensee's records for participation in drill and training evolutions between April 2014 and September 2016 to verify the accuracy of the licensee's data for drill participation opportunities. The inspectors verified that all members of the licensee's emergency response organization in the identified key positions had been counted in the reported performance indicator data. The inspectors reviewed the licensee's basis for reporting the percentage of emergency response organization members who participated in a drill. The inspectors reviewed drill attendance records and verified a sample of those reported as participating. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data.

These activities constituted verification of the emergency response organization drill participation performance indicator as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.4 Alert and Notification System Reliability (EP03)

a. Inspection Scope

The inspectors reviewed the licensee's records of Alert and Notification System tests conducted between April 2014 and September 2016 to verify the accuracy of the licensee's data for siren system testing opportunities. The inspectors reviewed procedural guidance on assessing Alert and Notification System opportunities and the results of periodic alert and notification system operability tests. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data.

These activities constituted verification of the alert and notification system reliability performance indicator 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 Semiannual Trend Review

a. Inspection Scope

The inspectors reviewed the licensee's corrective action program, performance indicators, system health reports, and other documentation to identify trends that might indicate the existence of a more significant safety issue. The inspectors verified that the licensee was taking corrective actions to address the following identified adverse trends:

- Increase in safety and human performance issues across the station
- Increase in equipment failures at the emergency operations facility

These activities constituted completion of one semiannual trend review sample, as defined in Inspection Procedure 71152.

b. Observations and Assessments

The inspectors evaluated a sample of issues and events that occurred over the course of the past two quarters to determine whether issues were appropriately considered as emerging or adverse trends. The inspectors verified that these issues were addressed within the scope of the corrective action program or through department review and documentation in the quarterly trend presentation for overall assessment.

The inspectors' review of the trend related to safety and human performance issues produced the following observation and assessment:

- During the period of November 14-16, 2016, the licensee had nine safety and human performance issues identified in their corrective action program. The licensee considered this a negative trend, verified the corrective actions for each issue were appropriate, and initiated adverse trend Condition Report 201609248 to determine the causes for the negative trend.

To address the issue the licensee performed the following immediate actions: they designated a safety/nuclear professional advocate for all work activities performed on December 14, 2016; they increased supervisor contact at job sites; and they performed a half-day site-wide stand-down at the department level on December 15, 2016. The licensee is also performing a structured cause analysis to determine why this occurred and identify additional necessary actions. The inspectors evaluated the licensee's response to the negative trend and determined the immediate actions taken were appropriate.

The inspectors' review of the trend related to the increase in equipment failures at the emergency operations facility produced the following observation and assessment:

- Throughout 2016, several condition reports were written regarding issues on equipment that would support the functionality of the emergency operations facility. Some of the issues involved the HVAC and fire detection systems and were either repeat issues or very similar in nature to previous issues. The licensee evaluated this trend, verified the corrective actions for each issue were appropriate, and initiated trend Condition Report 201605531.

The licensees' planned corrective actions are to replace the air conditioning unit to restore reliability of the ventilation system, and they have initiated a job [work order] to troubleshoot and evaluate the fire alarm system to determine the cause of the issues. Additional actions will be planned based on the results of the troubleshooting activities. The inspectors evaluated the licensee's response to the trend and determined the planned actions taken were appropriate.

c. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues

a. Inspection Scope

During an in-office inspection from October 26 through November 1, 2016, the inspectors reviewed the seven cyber security-related findings documented in Inspection Report 05000483/2014405, ADAMS accession number ML14304A195, for in-depth follow-up review. The inspectors reviewed updated procedures, updated critical digital asset listings, and corrective action documents.

The inspectors assessed the licensee's extent of condition reviews, compensatory actions, and pending and completed corrective actions. The inspectors verified that the licensee appropriately prioritized the corrective actions and that these actions were appropriate.

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

b. Findings

No findings were identified.

**40A3 Follow-up of Events and Notices of Enforcement Discretion (71153)**

.1 (Closed) Licensee Event Report 2015-001-01, Completion of a Shutdown Required by the Technical Specifications

a. Inspection Scope

On July 23, 2015, plant operators became aware of indications of an increase in the reactor coolant system unidentified leak rate. Indications included containment radiation

alarms as well as increasing containment humidity and sump levels. A reactor coolant inventory balance indicated an unidentified leak rate of 1.2 gallons per minute, which exceeded the technical specification limit of 1.0 gallons per minute for unidentified leakage. The licensee shut down the plant as required by technical specifications.

The licensee determined the leak was due to seat leakage through the pressurizer auxiliary spray supply drain valve BBV0400 and then through the non-safety related pipe flange immediately downstream of the valve. The licensee tightened the valve, which reduced the leakage to 60 drops per minute, and replaced the flange gasket. The licensee determined the root cause of the leak was that valve BBV0400 was not fully closed using normal closing force in November 2014 during Refueling Outage 20. The valve was replaced in April 2016 during Refuel Outage 21. Additionally, the licensee revised their procedures to require that selected valves (including BBV0400) be closed in Mode 3 using normal force or additional force if leakage is identified.

The inspectors reviewed the licensee's submittal along with corrective action documents. All findings were documented in NRC Inspection Report 05000483/2015004, ADAMS accession number ML16043A051. This licensee event report is closed.

b. Findings

No findings were identified.

.2 (Closed) Licensee Event Report 2015-002-01, Manual Auxiliary Feedwater System Actuation

a. Inspection Scope

On July 23, 2015, during a forced plant outage, the licensee tripped the only running main feedwater pump due to issues with the pump's speed control. Operators manually placed the auxiliary feedwater system in service in accordance with plant procedures. These procedures direct the operators to manually close the motor-driven auxiliary feedwater pump flow control valves (ALHV0005, ALHV0007, ALHV0009 and ALHV0011) and start the pumps. Once the pumps were started, the flow control valves were opened with the exception of ALHV0011 which did not open as demanded. The control room crew sent an operator to investigate and open this valve. The operator locally opened ALHV0011 and, after the valve was off its closed seat, the valve operated as expected from the main control room.

The manual actuation of the auxiliary feedwater system was a result of tripping the running main feedwater pump. The licensee determined the cause of the main feed pump speed control issue was a software malfunction in the main feedwater digital control system. This malfunction has only occurred once and the licensee could not recreate the malfunction.

The licensee took corrective actions to revise their procedures to allow the startup feedwater pump to remain in a ready state or be rapidly started if the main feedwater pump has to be tripped. This will help prevent the need to manually actuate the auxiliary feedwater system during a routine plant shutdown. The inspectors reviewed the licensee's submittal along with corrective action documents. All findings were

documented in NRC Inspection Reports 05000483/2015003, ADAMS accession number ML15306A580, and 05000483/2015009, ADAMS accession number ML16013A021. This licensee event report is closed.

b. Findings

No findings were identified.

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

##### Exit Meeting Summary

On November 2, 2016, the inspectors presented the cybersecurity inspection results to Mr. B. Cox, Senior Director, Nuclear Operations, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors did not review any proprietary information.

On November 10, 2016, the inspectors presented the radiation safety 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.

On November 18, 2016, the inspectors presented the results of the onsite inspection of the licensee's emergency preparedness program 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.

On January 4, 2017, the inspectors presented the 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.

#### **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.

- Technical Specification 5.4.1.a requires, in part, that written procedures shall be established, implemented and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Revision 2, Appendix A, Section 9.a, requires, in part, that maintenance should be properly pre-planned and performed in accordance with documented instructions appropriate to the circumstances. Contrary to the above, on October 19, 2016, the licensee failed to properly pre-plan and perform a post-maintenance test in accordance with documented instructions appropriate to the circumstances. Specifically, the post-maintenance test for work performed on valve EFHV0066, the essential service water to ultimate heat sink cooling tower train B bypass valve, did not include a seat leak test, which would be necessary for the work performed. As a result, on November 17, 2016, operators discovered this valve leaking

by at approximately 3900 gallons per minute. The licensee subsequently determined that the safety function of the ultimate heat sink would not be adversely affected with leakage up to 4100 gallons per minute. The inspectors evaluated the significance of the issue under the Significance Determination Process, as defined in Inspection Manual Chapter 0609.04, "Initial Characterization of Findings," and 0609 Appendix A, "The Significance Determination Process (SDP) for Findings at-Power," dated June 19, 2012. The inspectors concluded the finding was of very low safety significance (Green) because all questions in Exhibit 2 could be answered no. The licensee entered this issue into their corrective action program as Condition Report 201608791.

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee Personnel

S. Banker, Senior Director, Engineering  
T. Becker, Supervising Engineer, Performance Engineering  
F. Bianco, Director, Nuclear Operations  
J. Cortez, Manager, Site Recovery  
B. Cox, Senior Director, Nuclear Operations  
J. Geyer, Radiation Protection Manager  
C. Graham, Consulting Health Physicist  
B. Jungmann, Director, Maintenance  
L. Kanuckel, Director, Nuclear Oversight  
S. Kovaleski, Director, Engineering Design  
J. Kovar, Licensing Engineer  
T. Lowry, Manager, Cyber Security Program  
D. Mangold, Health Physicist  
K. March, Security Analyst, Cyber Security  
V. Miller, Supervising Health Physicist  
S. Petzel, Engineer, Regulatory Affairs  
G. Rauch, Manager, Emergency Preparedness  
J. Small, Manager, Chemistry  
K. Tipton, Supervisor, Engineering Systems  
M. Waller, Manager, Employee Concerns

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

#### Closed

05000483/2015-001-01	LER	Completion of a Shutdown Required by the Technical Specifications (Section 4OA3.1)
05000483/2015-002-01	LER	Manual Auxiliary Feedwater System Actuation (Section 4OA3.2)

### LIST OF DOCUMENTS REVIEWED

#### Section 1R01: Adverse Weather Protection

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OTN-AP-00001	Condensate Transfer and Storage System	14
OTN-AP-00003	Hardened Condensate Storage Tank Operations	3



Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OTN-QJ-00003, Checklist 2	Condensate Storage Tank Heat Tracing Lineup	2
OTS-ZZ-00007	Plant Cold Weather	32

Condition Reports

201000461	201608861	201609090	201609162
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Jobs

11002828	15004690	15511371	15511625	15512059
15512064	15512449	16001483	16005416	16005478
16005713	16005716	16005763	16005799	16005802
16005979	16005980	16005981	16005982	16005983
16502162				

**Section 1R04: Equipment Alignment**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OTN-AL-00001, Checklist 1	Auxiliary Feedwater Valve Alignment	22
OTN-AL-00001, Checklist 2	Motor-driven Auxiliary Feedwater Pump A and B Switch Alignment	18
OTN-AL-00001, Checklist 4	Auxiliary Feedwater Breaker Alignment	18
OTN-GG-00001	Fuel Building HVAC System	30
OTN-GG-00001, Checklist 1	Fuel Handling HVAC System Valve and Damper Lineup	13
OTN-GG-00001, Checklist 2	Fuel Handling Building HVAC System Breaker Lineup	13
OTN-GG-00001, Checklist 3	Fuel Handling HVAC System Switch Lineup	13
OTN-EG-00001	Component Cooling Water System	60
OTN-EG-00001, Checklist 1	Component Cooling Water System Normal Power Supply Lineup	21

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OTN-EG-00001, Checklist 2	Component Cooling Water System Normal Valve Lineup	21
OTN-EG-00001, Checklist 5	Component Cooling Water System Main Control Board Lineup	21

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-22AL01(Q)	Auxiliary Feedwater System Piping & Instrumentation Diagram	46
M-22EF01(Q)	Essential Service Water System Piping & Instrumentation Diagram	79
M-22GG01(Q)	Fuel Building HVAC Piping & Instrumentation Diagram	16
M-22GG02(Q)	Fuel Building HVAC Piping & Instrumentation Diagram	13
M-22EG01(Q)	Component Cooling Water System Piping & Instrumentation Diagram	11
M-22EG02(Q)	Component Cooling Water System Piping & Instrumentation Diagram	22
M-22-EG03(Q)	Component Cooling Water System Piping & Instrumentation Diagram	24

Condition Reports

201602658	201608571	201605765	201607267	201608376
201609284	201608440	201607831		

Jobs

08003471	16003536	16004820	16005725
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Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
LP-06	Systems, Safeguards Power – NB/NG/NK/NN	August 20, 2014
NB-05	System NB Protective Relay Setpoints Calculation	4

## Section 1R05: Fire Protection

### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
	Fire Preplan Manual	39
KC-60	C-9 Detailed Fire Modeling Report	0
KC-61	C-10 Detailed Fire Modeling Report	1
KC-82	Fire Safety Analysis for Fire Area A-2	1
KC-84	Fire Safety Analysis for Fire Area A-4	1
KC-120	Fire Safety Analysis for Fire Area C-9	1
KC-121	Fire Safety Analysis for Fire Area C-10	1
KC-125	Fire Safety Analysis for Fire Area C-14	1

## Section 1R11: Licensed Operator Requalification Program

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-0100B	Job Briefs	18
ODP-ZZ-00001	Operations Department – Code of Conduct	99
ODP-ZZ-00001, Addendum 2	Briefs	13
ODP-ZZ-00003	Shift Relief and Turnover	36
OSP-NE-0001B	Standby Diesel Generator B Periodic Tests	65

### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
DS-Cycle 16-4A	Dynamic Simulator Exam Scenario	August 22, 2016

## Section 1R12: Maintenance Effectiveness

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
MPM-SK-QW001, Addendum 5	Service and Inspection of “Pressure Doors”	0
OSP-KC-00015	Fire Door Inspections	15
WEP-ZZ-00001	Commercial Grade Evaluation	14

Condition Reports

201104612      201302289      201608195

Jobs

13001647      14508647      15509712      15512266

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
CG90006-6	Commercial Grade Evaluation for Gauge Snubbers	May 6, 2016
PM0900141	Annual Winter Tamper Testing	
PM1008215	Service Infrequent Use Pressure Doors (A&B)	
PM0907014	FPP Fire Door 12M Inspection	
RFR008750A	Install Snubbers on Various AFW Indicators	December 18, 1990
RFR008750B	Install Snubbers on Various AFW Indicators	April 12, 1999
RFR018037C	Supplemented – Add Piston Snubber for CCW Suction Pressure Gauges	April 14, 1999
RFR020560A	Supplemented – Allow Use of Pulsation Dampers on KJ Pressure Transmitters	July 21, 2000
RFR020560B	Correct Typographical Error to RFR 20560A	September 22, 2000
RFR020560C	Allow Use of Equivalent Piston-Type Snubbers	September 27, 2002

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EDP-ZZ-01129	Callaway Energy Center Risk Assessment	46
OTN-BG-00001, Addendum 4	Operation of CVCS Letdown	21
ODP-ZZ-00002	Equipment Status Control	85
ODP-ZZ-00002, Appendix 1	Protected Equipment Program	24
ODP-ZZ-00002, Appendix 2	Risk Management Actions for Planned Risk Significant Activities	11

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-22EJ01 (Q)	Residual Heat Removal System Piping and Instrumentation Diagram	62
M-22EM01 (Q)	High Pressure Coolant Injection System Piping and Instrumentation Diagram	38
M-22GL01 (Q)	Auxiliary Building HVAC Piping and Instrumentation Diagram	34
M-22GL02 (Q)	Auxiliary Building HVAC Piping and Instrumentation Diagram	27

Jobs

08003471      13007136

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Trend Data for Chemical & Volume Control System During Transient on October 20, 2016	December 14, 2016

**Section 1R15: Operability Evaluations**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-00220	Records Management	40
APA-ZZ-00605	Temporary System Modifications	33
APA-ZZ-00750	Hazard Barrier Program	37
OTN-NE-0001B, Addendum 3	Diesel Generator B Post Maintenance Run for Fuel System Priming	1
MSM-KJ-QK001	Emergency Diesel Generator Inspection	35

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-23FB05	Piping Isometric Auxiliary Steam System Supply Auxiliary Building	2

Condition Reports

201603929      201603960      201606547      201606579      201606595

Condition Reports

201606598	201607352	201607607	201607825	201608446
201608447	201608791	201609291	201609335	

Jobs

11007814	14512670	15000075
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Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision Date</u>
	DNA History Plot of B Emergency Diesel Generator Power, Current, Amps, and Frequency	July 27, 2016
	Fairbanks Morris Engineering Report of PC2.5 Fuel Injection Pump	August 25, 2016
	Night Order - APA-ZZ-00750 Hazard Barrier Program, Identified Discrepancies	3
M-YY-49	Penetrant Test Profiles for Each Room in the Auxiliary Building Resulting from High Energy Line Break	1C
M-YY-49, Revision 1, Addendum 4	Additional HELB Scenarios	0
RFR 201201033	Request for Resolution – Provide Basis for HELB Program	0

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EDP-ZZ-01128	Maintenance Rule Program	24
EDP-ZZ-01128, Appendix 1	SSCS in the Scope of the Maintenance Rule at Callaway	11
EDP-ZZ-01128 Appendix 2	Summary of SSC Performance Criteria	31
EDP-ZZ-01128, Appendix 4	Maintenance Rule System Function	16
MTE-ZZ-QA015	MOVATS UDS Testing of Limitorque Motor Operated Butterfly Valves	18
MTM-ZZ-QA006	Limitorque Actuator Electrical Rework and Adjustment	58
OSP-EF-0002A	Essential Service Water Train A Flow Verification	6

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OSP-EF-V001B	Essential Service Water Train B Valve Operability	53
OSP-NE-0001B	Standby Diesel Generator B Periodic Tests	65
OTN-NE-0001B	Standby Diesel Generation System – Train B	53
QCP-ZZ-05041	Visual Examination to ASME VT-2	29

Condition Reports

201608795	201608883	201609008	201609021	201609022
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Jobs

13006121	15004653	15004983	16005647	16005795
16512958	11503951	13000681	15510786	10502326
15511073	12002436	15001732	16006092	

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Vibration Results for CGM01B	November 15, 2016

**Section 1R22: Surveillance Testing**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
ISL-NF-NB01A	NB01 Degraded & UV to LSELS Channel I	29
ISL-NF-NB01B	NB01 Degraded & UV to LSELS Channel II	28
ISL-NF-NB01C	NB01 Degraded & UV to LSELS Channel III	27
ISL-NF-NB01D	NB01 Degraded & UV to LSELS Channel IV	27
OSP-EM-P001A	Safety Injection Train A Inservice Test – Group B	52
OSP-SA-0009A	Train A CISA Slave Relay Test	19
OSP-SA-0012A	Train A SIS Slave Relay Test	29

Condition Reports

201609345	201609365	201609388
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Jobs

16511465	16513719	16513723	16513725	16513726
16511654	16512085			

**Section 1EP2: Alert and Notification System Testing**

Procedures and Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
KSP-ZZ-00008	Tone Alert Radios	7
KSP-ZZ-00110	Siren Alerting System Testing	14

Condition Reports

201404446	201406861	201501559	201504153	201504922
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Jobs

13503075	14502659	15500540
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Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Preventative Maintenance Records, Sirens 01 through 62	2014
	Preventative Maintenance Records, Sirens 01 through 62	2015
	Preventative Maintenance Records, Sirens 01 through 62	2016

**Section 1EP3: Emergency Response Organization Staffing and Augmentation System**

Procedures and Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EIP-ZZ-00200	Augmentation of the Emergency Response Organization	21
KOA-ZZ-00200	Activation of the Callaway Plant Emergency Callout System	17
KSP-ZZ-00102	Monthly Emergency Communications Testing	14
KSP-ZZ-00103	Quarterly Emergency Communications Testing	5
KSP-ZZ-00201	Emergency Augmentation Drill/Test	8

Condition Reports

201506484	201507987	201601334
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## Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
	After Action Report for the Off Hours and Augmentation Drill conducted October 29, 2015	
14500586	ERO Augmentation Testing Results	May 17, 2014
14505035	ERO Augmentation Testing Results	July 25, 2014
14508093	ERO Augmentation Testing Results	October 7, 2014
14510722	ERO Augmentation Testing Results	January 17, 2015
15500632	ERO Augmentation Testing Results	April 20, 2015
15504072	ERO Augmentation Testing Results	September 2, 2015
15511285	ERO Augmentation Testing Results	February 15, 2016
16501826	ERO Augmentation Testing Results	May 25, 2016
16506957	ERO Augmentation Testing Results	September 8, 2016

## **1EP4: Emergency Action Level and Emergency Plan Changes**

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-00004	Emergency Preparedness Department Responsibilities	22
APA-ZZ-00500	Corrective Action Program	65
APA-ZZ-00500, Appendix 12	Significant Adverse Condition	26
APA-ZZ-00500, Appendix 13	Adverse Condition	27
APA-ZZ-00500, Appendix 17	Screening Process Guidelines	29
APA-ZZ-00500, Appendix 22	Corrective Action Program Definitions	13
EIP-ZZ-00260	Event Closeout/Plant Recovery	27
EIP-ZZ-A0001	Emergency Response Organization	18
EIP-ZZ-A0020	Maintaining Emergency Preparedness	30

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EIP-ZZ-A0066	RERP Training Program	24
KDP-ZZ-00013	Emergency Response Facility and Equipment Evaluation	13, 14
KDP-ZZ-00013, Appendix 1	Equipment Important to Emergency Response Matrix	3
KDP-ZZ-00300	Maintaining Emergency Preparedness Supplemental Documents	17
KDP-ZZ-00400	RERP Impact Evaluations and Changes	23, 24
KDP-ZZ-02001	Drill and Exercise Program	21, 22
KSP-ZZ-00004	Emergency Response Facilities	7
KSP-ZZ-00007	Offsite Effectiveness of the Emergency Preparedness Program	13
KDP-ZZ-00013	Emergency Response Facility and Equipment Evaluation	14

Condition Reports

201404689	201405054	201404717	201404752	201404902
201502111	201504922	201505183	201505228	201505398
201505406	201505409	201507442	201507633	201507635
201507637	201507639	201507640	201600391	201606250
201606496	201606500	201606501	201605702	201608771

Jobs

13512566	14504304	14508579	14511476	15502209
155022634	15505557	15508413	15508920	16500262
16501351	16504550	16502589	16505861	

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
	After Action Report for the Exercise conducted May 8, 2014	
	After Action Report for the Exercise conducted July 10, 2014	
	After Action Report for the Field Monitoring Drill conducted July 10, 2014	

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
	After Action Report for the Contaminated Injured Worker Drill conducted July 10, 2014	
	After Action Report for the Exercise conducted August 28, 2014	
	After Action Report for the Exercise conducted September 4, 2014	
	After Action Report for the Exercise conducted September 11, 2014	
	After Action Report for the Exercise conducted September 18, 2014	
	After Action Report for the Exercise conducted September 25, 2014	
	After Action Report for the Health Physics Drill conducted September 30, 2014	
	After Action Report for the Exercise conducted January 8, 2015	
	After Action Report for the Exercise conducted January 15, 2015	
	After Action Report for the Exercise conducted January 22, 2015	
	After Action Report for the Exercise conducted January 29, 2015	
	After Action Report for the Exercise conducted February 5, 2015	
	After Action Report for the Exercise conducted February 12, 2015	
	After Action Report for the Exercise conducted March 10, 2015	
	After Action Report for the Exercise conducted May 5, 2015	
	After Action Report for the Health Physics Drill conducted June 10, 2015	
	After Action Report for the Health Physics Drill conducted September 17, 2015	
	After Action Report for the Exercise conducted September 16, 2015	
	After Action Report for the Exercise conducted September 23, 2015	

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
	After Action Report for the Exercise conducted September 30, 2015	
	After Action Report for the Exercise conducted October 7, 2015	
	After Action Report for the Exercise conducted October 14, 2015	
	After Action Report for the Exercise conducted October 21, 2015	
	After Action Report for the Exercise conducted December 10, 2015	
	After Action Report for the Radiological Monitoring Drill conducted December 10, 2015	
	After Action Report for the Exercise conducted January 14, 2016	
	After Action Report for the Exercise conducted January 21, 2016	
	After Action Report for the Exercise conducted January 28, 2016	
	After Action Report for the Exercise conducted February 4, 2016	
	After Action Report for the Exercise conducted February 11, 2016	
	After Action Report for the Exercise conducted February 18, 2016	
	After Action Report for the Exercise conducted June 16, 2016	
	After Action Report for the Health Physics Drill conducted June 16, 2016	
	After Action Report for the Environmental Monitoring Drill conducted September 1, 2016	
	After Action Report for the Health Physics Drill conducted September 8, 2016	
	After Action Report for the Contaminated Injured Worker Drill conducted November 8, 2016	
	Benchmark 201600062-04, ERO Improvement	February 15, 2016
	Callaway Plant Radiological Emergency Response Plan	47

### Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/ Date</u>
	Simple Self Assessment 201308863-24, Effectiveness Review Emergency Preparedness Standards	March 3, 2014
	Student Critique Comments for Session 20160143, RERP EOF Facility	March 9, 2016
	Emergency Preparedness Equipment Repair Status, Second Quarter	2014
	Emergency Preparedness Equipment Repair Status, Third Quarter	2014
	Emergency Preparedness Equipment Repair Status, Fourth Quarter	2014
PM0912068	November 3, 2014, Media Day Package	
PM0912069	Annual EP Brochure Mailing and Follow-up, 2015	

### **Section 1EP6: Drill Evaluation**

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EIP-ZZ-00101, Addendum 2	Emergency Action Level Technical Bases Document	11

#### Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
DS-Cycle 16-4A	Dynamic Simulator Exam Scenario	August 22, 2016

### **Section 2RS2: Occupational ALARA Planning and Controls**

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-01001	Callaway Plant ALARA Program	26
APA-ZZ-01004	Radiological Work Standards	28
HDP-ZZ-01100	ALARA Planning and Review	19
HDP-ZZ-01200	Radiation Work Permits	30
HDP-ZZ-01500	Radiological Postings	44

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
HTP-ZZ-06001	High Radiation/Locked High Radiation/Very High Radiation Area Access	50

Audits and Self-Assessments

<u>Number</u>	<u>Title</u>	<u>Date</u>
AP15-002	Nuclear Oversight Audit of Radiation Protection	February 23, 2015
20140632-6.2	Radiation Safety Self-Assessment	October 12, 2015
201500405-06	ALARA Plans, Packages and RWPs Self-Assessment	June 22, 2015

Condition Reports

201500844	201507845	201508261	201508608	201600550
201601052	201602957	201603512	201604028	201607143
201600999	201605317	201604480	201603017	201507021
201603425	201607667	201607832	201608655	201600468
201604746	201602487	201506676		

Radiation Work Permits

<u>Number</u>	<u>Title</u>	<u>Revision</u>
210813187	Install Stud Tensioner Hoists, Detension Reactor Vessel Studs	0
210917004MAN	Steam Generator Manway Cover Removal, Re-installation and Bolt Hole Work	1
210917004PLUG	Steam Generator Tube Plugging and Stabilizing, Including Setup	2
15004134	Load Legacy Waste drums into cask and Ship Legacy Waste Drums	0

ALARA Planning, In-Progress Reviews, and Post-Job Reviews

<u>Number</u>	<u>Title</u>	<u>Revision</u>
210813187	Install Stud Tensioner Hoists, Detension Reactor Vessel Studs	0
210917004MAN	Steam Generator Manway Cover Removal, Re-installation and Bolt Hole Work	1

ALARA Planning, In-Progress Reviews, and Post-Job Reviews

<u>Number</u>	<u>Title</u>	<u>Revision</u>
210917004PLUG	Steam Generator Tube Plugging and Stabilizing, Including Setup	2
21091700EC	Steam Generator Tube Eddy Current Testing In All Four Steam Generators	2

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
	Callaway Energy Center Long Range Dose And Source Term Reduction Plan	6
	Refuel Outage 21 Outage ALARA Report	
	Selected Log Entries from the Outage Control Center (OCC) Refuel Outage 21	

**Section 2RS4: Occupational Dose Assessment**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-00014	Conduct of Operations – Radiation Protection	22
APA-ZZ-01000	Callaway Energy Center Radiation Protection Program	41
APA-ZZ-01000, Appendix A	Control of Radioactive Material	20
APA-ZZ-01004	Radiological Work Standards	28
APA-ZZ-01004, Appendix A	General Instructions for Donning / Removing Protective Clothing	6
APA-ZZ-01004, Appendix B	General Instructions for Personnel Frisking Upon Exit from Satellite RCA or Contaminated Area	5
APA-ZZ-01004, Appendix C	General Instructions for Donning / Removing Respiratory Equipment	6
APA-ZZ-01004, Appendix D	General Instructions for Use of Primary Monitoring Device	2
HDM-ZM-01300	Internal Dose Assessment Guidelines	0
HDP-ZZ-1200	Radiation Work Permits	30
HDP-ZZ-01300	Internal Dosimetry Program	34
HDP-ZZ-01433	Personnel Exposure Records	56
HDP-ZZ-01500	Radiological Postings	44

## Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
HDP-ZZ-06001	High Radiation / Locked High Radiation / Very High Radiation Area Access	50
HTP-HC-09002	10 CFR 61 Sampling Program	4
HTP-ZZ-1302-DTI-DPW	Response to Positive In Vitro Count for Declared Pregnant Woman	6
HTP-ZZ-1302-DTI-Entry/Return	Response to Positive Entry or Return from Trip In Vitro Count	8
HTP-ZZ-1302-DTI-Medical-Admin	Response to a Medical Administration of Radioactive Nuclides	4
HTP-ZZ-1302-DTI-Routine / Diag	Response to Positive Routine or Diagnostic In Vitro Count	17
HTP-ZZ-1302-DTI-Terminations	Response to Positive Termination In Vitro Count	20
HTP-ZZ-1320-DTI-Initial Dose	Initial Assessment of Internal Dose Equivalent	13
HTP-ZZ-01433	Personnel Exposure Records	57
HTP-ZZ-04700	Count Room and Whole Body Counter Quality Control Program	19
HTP-ZZ-06009	Personnel Contamination Assessment and Decontamination	49
RP-DTI-Air Sample Dose	Intake Assessment from Air Samples	6
RP-DTI-Count Room Routines	Count Room Routine Activities	23
RP-DTI-In Vitro Bioassay	In Vitro Bioassay Sample Collection	2
RP-DTI-TRU Assessment	Alpha Monitoring Facility Characterization	6

## Audits and Self-Assessments

<u>Number</u>	<u>Title</u>	<u>Date</u>
AP15-002	Nuclear Oversight Audit of Radiation Protection	February 23, 2015
AP16-003	Nuclear Oversight Audit of the Radiological and Non-Radiological Environmental Monitoring Programs	July 15, 2016



### Condition Reports

201301109	201505336	201600999	201601787	201602487
201603733	201605807	201606446	201607143	

### Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Nuclide Distribution Report	September 10, 2015
	NVLAP Certificate of Accreditation; Effective Dates 01/01/2016 through 12/31/2016	Reviewed November 7, 2016
	Calibration of the FastScan FS-5301-HP	October 11, 2016
	Calibration of the Chair Whole Body Counter	April 24, 2015
	Selected Dosimetry Records for Declared Pregnant Workers	2015 and 2016
	Selected Investigations of Potentially Discrepant Dosimetry Records	2015 and 2016
HPIC 0202	Electronic Dosimeter Calibration Adjustment Factor	2
PM0700003	Preventive Maintenance Surveillance to Perform 10 CFR 61 Analysis	August 11, 2016

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

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
	MSPI Basis Document	17
APA-ZZ-01111	Mitigating Systems Performance Index (MSPI) Program Administration	4
APA-ZZ-01111, App A	MSPI/WANO Performance Indicators, Data Collection and Reporting	10
RRA-ZZ-00001	NRC Performance Indicator Program	9
KDP-ZZ-02000	NRC Performance Indicator Data Collection	17, 18
KSP-ZZ-00110	Siren Alerting System Testing	14
EIP-ZZ-00101	Classification of Emergencies	52, 53
EIP-ZZ-00101, Addendum 2	Emergency Action Level Technical Bases Document	10, 11

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EIP-ZZ-00201	Notification	50
EIP-ZZ-00201, Addendum 1	Control Room Notification Flowchart	26
EIP-ZZ-00201, Addendum C	EOF Notification Package	27
EIP-ZZ-00212	Protective Action Recommendations	27, 28
KOA-ZZ-04000	Completing the Offsite Notification Form	1

Condition Reports

201501539	201502626	201506160	201506748	201507416
2010508761	201602049	201602658	201603389	201603472
201603598	201604942	20160180	201605700	201606472
201606516	201607559	201607695	201607736	201607748
201607841	201608021	201608148	201608215	201608656
201608823	201608824			

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
APA-ZZ-00500, Appendix 10	Trending Program	12
APA-ZZ-01108	Cyber Security Program	4
APA-ZZ-01108, Addendum A	CDA-Related Removable Media and Removable / Portable Device Management	6
EDP-ZZ-01108	Cyber Security Program Implementation	6
EDP-ZZ-01108, Addendum 1	Digital Assessment Process	8
DTI-CS-004	Malware Scanning DTI	6
SDP-PI-CYBER	Cyber Security	2

Condition Reports

201303314	201304697	201305571	201306011	201306178
201306390	201308134	201401611	2014003533	201404013

Condition Reports

201404421	201404982	201405213	201405220	201405223
201405224	201406337	201406343	201507992	201607443
201607679	201607960	201608761	201609248	

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
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J-113A-00493	Data Diode Block Diagram	0
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Whitepaper - Callaway Actions to Correct Issues Related to Milestone1-7 Inspection Report 2014405

Whitepaper - CDAs identified since the Milestone 1-7 Inspection

CDA Kiosk Malware Scanning and Data Transfer Guidance

**The following items are requested for the  
Occupational/Public Radiation Safety Inspection  
at Callaway Plant  
November 7 through 10, 2016  
Integrated Report 2016004**

Inspection areas are listed in the attachments below.

Please provide the requested information on or before October 17, 2016.

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 Martin J. Phalen at (817) 200-1158 or [martin.phalen@nrc.gov](mailto:martin.phalen@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: October 26-30, 2015

- 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 September 1, 2015, 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 sub-tiered systems) written since September 1, 2015, 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.

List of Condition Reports initiated by Radiation Protection, since September 1, 2015.

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 September 1, 2015, 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 25-29, 2014

- A. List of contacts and telephone numbers for the following areas:
  - 1. Dose Assessment personnel
- B. Applicable organization charts.
- C. Audits, self-assessments, vendor or NUPIC audits of contractor support, and LERs written since August 1, 2014, related to:
  - 1. Occupational Dose Assessment
- D. Procedure indexes for the following areas:
  - 1. 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 sub-tiered systems) written since August 1, 2014, 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 August 1, 2014, 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.