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

August 8, 2018

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

SUBJECT: CALLAWAY PLANT - NRC INTEGRATED INSPECTION REPORT 05000483/2018002

Dear Mr. Diya:

On June 30, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Callaway Plant. On July 10, 2018, the NRC inspectors discussed the results of this inspection with Mr. M. McLachlan, Senior Director, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented four findings of very low safety significance (Green) in this report. All of these findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 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; 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; and the NRC resident inspector at the Callaway Plant.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

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 05000483/2018002
w/Attachments:
1: Documents Reviewed
2. Request for Information Quarterly Baseline Inspection
3: Request for Information Occupational Radiation Safety Inspection

cc: Electronic Distribution for Callaway Plant

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	05000483
License Number:	NPF-30
Report Number:	05000483/2018002
Enterprise Identifier:	I-2018-002-0006
Licensee:	Union Electric Company
Facility:	Callaway Plant
Location:	8315 County Road 459 Steedman, MO 65077
Inspection Dates:	April 1 to June 30, 2018
Inspectors:	D. Bradley, Senior Resident Inspector S. Janicki, Resident Inspector P. Elkmann, Senior Emergency Preparedness Inspector N. Greene, PhD, Senior Health Physicist P. Hernandez, Health Physicist D. You, Resident Inspector
Approved By:	N. Taylor Chief, Project Branch B Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at the Callaway Plant in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information. Findings and violations being considered in the NRC's assessment are summarized in the tables below.

List of Findings and Violations

Failure to Adequately Assess and Manage Risk Associated with Switchyard Work During a Planned Risk Significant Turbine-Driven Auxiliary Feedwater Pump Equipment Outage			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green NCV 05000483/2018002-01 Closed	H.12— Avoid Complacency	71111.12— Maintenance Effectiveness
The inspectors identified a Green, non-cited violation of 10 CFR 50.65(a)(4), "Requirements for monitoring the effectiveness of maintenance at Nuclear Power Plants," for the licensee's failure to adequately assess and manage risk associated with switchyard work during a planned risk significant turbine-driven auxiliary feedwater pump equipment outage. Specifically, the licensee failed to properly classify switchyard work and manage the risk as required by Procedures APA-ZZ-00322, Appendix F, "Online Work Integrated Risk Management," Revision 16, and ODP-ZZ-00002, Appendix 2, "Risk Management Actions for Planned Risk Significant Activities," Revision 13.			

Failure to Establish Maintenance Procedures for Doors that Provide Safety-Related Functions			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000483/2018002-02 Closed	H.4— Teamwork	71111.12— Maintenance Effectiveness
The inspectors identified a Green, non-cited violation of Technical Specification 5.4.1.a, "Procedures," for the licensee's failure to establish, implement, and maintain procedures associated with door maintenance. Specifically, the licensee failed to establish, implement, and maintain maintenance procedures for doors that provide safety-related functions such as ventilation pressure boundaries. As a result, 15 safety-related doors were identified that either had degraded conditions or that did not have a periodic maintenance task to inspect the doors.			

Failure to Critique an Inaccurate Emergency Classification During a Simulator Training Scenario			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Emergency Preparedness	Green NCV 05000483/2018002-03 Closed	P.6—Self-Assessment	71114.05—Maintenance of Emergency Preparedness
The inspectors identified a non-cited violation of 10 CFR 50.47(b)(14) for the licensee's failure to critique an inaccurate emergency classification made during licensed operator training.			

Failure of an Analysis of the Impact of Changes to Emergency Action Levels to Demonstrate the Changes Did Not Reduce the Effectiveness of the Emergency Plan			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Emergency Preparedness	Green NCV 05000483/2018002-04 Closed	H.14—Conservative Bias	71114.05—Maintenance of Emergency Preparedness
The inspectors identified a non-cited violation of 10 CFR 50.54(q)(3) for the failure of an analysis of the impact of changes to licensee emergency action levels to demonstrate that the changes did not reduce the effectiveness of the emergency plan.			

Additional Tracking Items

Type	Issue number	Title	Report Section	Status
LER	05000483/2018-001-00	Violation of Technical Specification 3.6.3, Containment Isolation Manual Valve Found in Open Position	71153	Closed

PLANT STATUS

Callaway Plant began the inspection period at full power and remained at this power level through the end of the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public Web site at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in Inspection Manual Chapter 2515, Appendix D, "Plant Status," and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01—Adverse Weather Protection

Summer Readiness (1 Sample)

The inspectors evaluated summer readiness of offsite and alternate alternating current power systems on May 3, 2018.

71111.04—Equipment Alignment

Partial Walkdown (4 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

(1) Safety injection pump train B on April 27, 2018

(2) Emergency diesel generator train B, including related essential service water on May 1, 2018

(3) Motor-driven auxiliary feedwater train A and train B on May 8, 2018

(4) Emergency diesel generator train A on May 29, 2018

71111.05AQ—Fire Protection Annual/Quarterly

Quarterly Inspection (4 Samples)

The inspectors evaluated the fire protection program implementation in the following selected areas:

(1) Containment spray train A, fire area A-2, on April 10, 2018

(2) Emergency diesel generator train A, fire area D-1, on April 10, 2018

(3) Auxiliary feedwater pump and valve rooms, fire areas A-13, A-14, A-15, A-29, and A-30, on June 12, 2018

(4) Fuel Handling Building, fire area FB-1, on June 28, 2018

71111.11—Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated simulator training for operating crews' annual exam activities on May 31, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated control rod positioning in the control room on May 11, 2018.

71111.12—Maintenance Effectiveness

Routine Maintenance Effectiveness (1 Sample)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the turbine-driven auxiliary feedwater system on May 9, 2018.

Quality Control (1 Sample)

The inspectors evaluated maintenance and quality control activities associated with the safety-related door preventive maintenance, including quality control, for hazard barriers on April 17, 2018.

71111.13—Maintenance Risk Assessments and Emergent Work Control (4 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

(1) Elevated risk actions due to planned containment spray train A equipment outage on April 11, 2018

(2) Elevated risk actions due to planned emergency diesel generator train B and essential service water train B equipment outage on May 1, 2018

(3) Elevated risk actions due to planned main turbine control oil system equipment outage on May 28, 2018

(4) Elevated risk actions due to emergent work on the emergency diesel generator train A lube oil system on June 21, 2018

71111.15—Operability Determinations and Functionality Assessments (8 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) Residual heat removal valve interlocks on April 2, 2018

(2) Auxiliary transformer gas testing on April 12, 2018

(3) Air conditioning units, SGK04 and SGK05 series, restart capability on April 17, 2018

(4) Containment sump indications on April 24, 2018

(5) Emergency operating procedures for natural circulation cooldown on May 7, 2018

(6) Atmospheric steam dump and auxiliary feedwater nitrogen accumulators, including operator workaround review, on May 18, 2018

(7) Emergency diesel generator train B fuel rack displacement on May 22, 2018

(8) Safety injection tank C accumulator vent valve reseating on June 15, 2018

71111.19—Post Maintenance Testing (6 Samples)

The inspectors evaluated the following post maintenance tests:

(1) Essential service water cross-connect valve EFHV0026 equipment outage on April 23, 2018

(2) Essential service water cross-connect valve EFHV0040 equipment outage on April 25, 2018

(3) Containment cooler trains B and D after equipment outage on May 22, 2018

(4) Emergency diesel generator train B after equipment outage on May 30, 2018

(5) Control room air conditioning unit SGK04A equipment outage on June 5, 2018

(6) Circuit breaker NG02BJF2 after equipment outage on June 19, 2018

71111.22—Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (4 Samples)

(1) ISF-AL-00P37, condensate storage tank to auxiliary feedwater suction header pressure channel test on April 17, 2018

(2) OSP-NB-00001, class 1E electrical source verification on May 14, 2018

(3) OSP-AL-V001B, train B auxiliary feedwater valve in-service test on April 24, 2018

(4) OSP-NE-0001A, emergency diesel generator train A periodic tests on June 13, 2018

In-service (1 Sample)

The inspectors evaluated OSP-EN-P001A, containment spray pump train A in-service test on April 11, 2018.

Reactor Coolant System Leak Detection (1 Sample)

The inspectors evaluated OSP-BB-00009, reactor coolant system inventory balance on May 15, 2018.

71114.02—Alert and Notification System Testing (1 Sample)

The inspectors evaluated maintenance and testing of the alert and notification system on April 25, 2018.

71114.03—Emergency Response Organization Staffing and Augmentation System (1 Sample)

The inspectors evaluated readiness of the emergency preparedness organization on April 26, 2018.

71114.04—Emergency Action Level and Emergency Plan Changes (4 Samples)

The inspectors evaluated submitted emergency action level and emergency plan changes on April 26, 2018. This evaluation does not constitute NRC approval.

71114.05—Maintenance of Emergency Preparedness (1 Sample)

The inspectors evaluated maintenance of the emergency preparedness program between April 23 and April 25, 2018.

71114.06—Drill Evaluation

Drill/Training Evolution (1 Sample)

The inspectors evaluated the full participation drill, Team 5 on May 24, 2018.

RADIATION SAFETY

71124.02 - Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls

Radiological Work Planning (1 Sample)

The inspectors evaluated the licensee's radiological work planning by reviewing the following activities:

(1) RF22 crane valve work
(2) R22-55320 reactor building head lift

(3) R22-56321 remove/reinstall reactor vessel lower internals
(4) R22-50101 radiation Protection Routine Activities Reactor Building
(5) R22-55220 reactor building head removal

Verification of Dose Estimates and Exposure Tracking Systems (1 Sample)

The inspectors evaluated dose estimates and exposure tracking.

71124.04 - Occupational Dose Assessment

Source Term Characterization (1 Sample)

The inspectors evaluated the licensee's source term characterization.

External Dosimetry (1 Sample)

The inspectors evaluated the licensee's external dosimetry program.

Internal Dosimetry (1 Sample)

The inspectors evaluated the licensee's internal dosimetry program.

Special Dosimetry Situations (1 Sample)

The inspectors evaluated the licensee's performance for special dosimetry situations.

OTHER ACTIVITIES – BASELINE

71151—Performance Indicator Verification (6 Samples)

The inspectors verified licensee performance indicators submittals listed below:

(1) MS05: Safety System Functional Failures Sample (04/01/2017 - 03/31/2018)

(2) MS08: Heat Removal Systems (04/01/2017 - 03/31/2018)

(3) BI02: Reactor Coolant System Leak Rate Sample (04/01/2017 - 03/31/2018)

(4) EP01: Drill/Exercise Performance Sample (04/01/2017 – 03/31/2018)

(5) EP02: Emergency Response Organization (ERO) Drill Participation Sample (04/01/2017 – 03/31/2018)

(6) EP03: Alert and Notification System Reliability Sample (04/01/2017 – 03/31/2018)

71152—Problem Identification and Resolution

Semiannual Trend Review (1 Sample)

The inspectors reviewed the licensee's corrective action program for trends that might be indicative of a more significant safety issue.

71153—Follow-up of Events and Notices of Enforcement Discretion

Licensee Event Reports (1 Sample)

The inspectors evaluated Licensee Event Report 05000483/2018-001-00, Violation of Technical Specification 3.6.3, Containment Isolation Manual Valve Found in Open Position on March 12, 2018, which can be accessed at https://lersearch.inl.gov/LERSearchCriteria.aspx. A minor violation was documented in the inspection results section of this report.

INSPECTION RESULTS

Failure to Adequately Assess and Manage Risk Associated with Switchyard Work During a Planned Risk Significant Turbine-driven Auxiliary Feedwater Pump Equipment Outage			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green NCV 05000483/2018002-01 Closed	H.12— Avoid Complacency	71111.12— Maintenance Effectiveness

The inspectors identified a Green, non-cited violation of 10 CFR 50.65(a)(4), "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," for the licensee's failure to adequately assess and manage risk associated with switchyard work during a planned risk significant turbine-driven auxiliary feedwater (TDAFW) pump equipment outage. Specifically, the licensee failed to properly classify switchyard work and manage the risk as required by Procedures APA-ZZ-00322, Appendix F, "Online Work Integrated Risk Management," Revision 16, and ODP-ZZ-00002, Appendix 2, "Risk Management Actions for Planned Risk Significant Activities," Revision 13.

Description:

On February 20, 2018, the licensee was contacted by Ameren corporate regarding an issue with one of Callaway's offsite power lines, Callaway-Bland-1. Ameren identified a likely failure of the trip tone transmitter, a programmable logic controller that communicates grid information between substations. The trip tone transmitter protects downline equipment during a grid transient by tripping the breaker prior to the transient reaching the breaker. Condition Report 201800866 and Job 18000724 were written to document and correct this issue.

On February 27, 2018, the licensee commenced a scheduled technical specification equipment outage for the TDAFW pump. Risk management actions were briefed and established per Procedure ODP-ZZ-00002, Appendix 2, "Risk Management Actions for Planned Risk Significant Activities," which included a requirement to "NOT allow work in the switchyard that could cause a Loss of Offsite Power."

Later on February 27, 2018, the Ameren corporate relay team arrived on site to replace the Callaway-Bland-1 trip tone transmitter. This job required the relay team to access the switchyard and to replace the trip tone transmitter for Callaway-Bland-1 at switchyard breaker MDV44. This job was not listed on the weekly work schedule or incorporated into the site's overall risk management plan in the previous weeks. Callaway's electrical maintenance team and the Ameren corporate relay team briefed operations on the job requirements, how the maintenance would be controlled, and the required switchyard entry. The brief also covered a precaution in the work package warning that work could result in a trip of the Callaway-Bland-1 line. While the precaution was covered during the brief, the maintenance

team discussed that a loss of offsite power was unlikely, the precaution was automatically entered into the work package based on location, and the precaution was not because of an actual risk.

The inspectors reviewed the licensee's assessment and management of risk. Procedure APA-ZZ-00322, Appendix F, Section 4.4.9, MD system (switchyard circuit breaker) work was required to "be evaluated at a minimum as Medium Risk in Nuclear Safety/Operational Risk . . . because of the potential consequence to nuclear safety." Operations, however, updated the job risk to low, authorized vehicles in the switchyard, and gave permission for the work to proceed. Operations did not correctly re-perform the TDAFW pump risk assessment based on the new in-plant conditions as required by Procedure APA-ZZ-00322, Appendix F, Section 4.1.4.

Corrective Action: Since the switchyard work was complete when the issue was identified, the licensee initiated a condition report and calculated the increase in risk incurred as a result of this issue. The incremental core damage probability deficit (ICDPD) was found to be 3E-8 using the licensee's safety monitor software.

Corrective Action Reference: Condition Report 201800866

Performance Assessment:

Performance Deficiency: Failure to adequately assess and manage risk associated with switchyard work during a risk-significant TDAFW pump maintenance period was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely affected the protection against external factors attribute of the Initiating Event Cornerstone to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, Procedure ODP-ZZ-00002, Appendix 2, "Risk Management Actions for Planned Risk Significant Activities," included a requirement to "NOT allow work in the switchyard that could cause a Loss of Offsite Power."

Significance: Because the finding affects the licensee's assessment of risk associated with performing maintenance activities, NRC Inspection Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," dated June 19, 2012, directs significance determination via the use of NRC Inspection Manual Chapter 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," dated May 19, 2005. The inspectors used Inspection Manual Chapter 0609, Appendix K, to determine that the performance deficiency was of very low safety significance (Green). Specifically, the finding was not related to risk management actions only since the licensee failed to adequately assess risk. Since the finding involved approximately four hours of switchyard work with TDAFW pump out of service, the finding had a risk deficit of 3E-8 (<1E-6 ICDPD) determined from the licensee's safety monitor software.

Cross-cutting Aspect: The finding had a cross-cutting aspect in the area of human performance associated with avoid complacency because the licensee failed to ensure individuals recognize and plan for the possibility of mistakes and ensure individuals implement the appropriate error reduction tools [H.12]. Specifically, the team assumed the switchyard work would be successful in the planning and briefing of the job. Although a vehicle was authorized in the switchyard and the work occurred in the relay room where

offsite power can be tripped, the team decided that a loss of offsite power was unlikely and did not recognize the possibility of mistakes that could lead to inadvertent tripping of offsite power.

Enforcement:

Violation: Title 10 CFR 50.65(a)(4) states, in part, "Before performing maintenance activities (including, but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from proposed maintenance activities." The licensee established procedures APA-ZZ-00322, Appendix F, "Online Work Integrated Risk Management," Revision 16, and ODP-ZZ-00002, Appendix 2, "Risk Management Actions for Planned Risk Significant Activities," Revision 13, in part, to meet this requirement.

Contrary to the above, on February 27, 2018, the licensee failed to adequately assess and manage the associated increase in risk from the switchyard work during risk significant TDAFW pump maintenance. Specifically, Procedure ODP-ZZ-00002, Appendix 2, "Risk Management Actions for Planned Risk Significant Activities," included a requirement to "NOT allow work in the switchyard that could cause a Loss of Offsite Power." The licensee failed to correctly update the original TDAFW pump risk assessment based on the new plant configuration with switchyard work in progress. As a result, the licensee incorrectly updated the job risk to low, authorized vehicles in the switchyard, and allowed work in the switchyard that could have resulted in a trip of the Callaway-Bland-1 line.

Disposition: This violation is being treated as a non-cited violation consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Establish Maintenance Procedures for Doors that Provide Safety-Related Functions			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000483/2018002-02 Closed	H.4—Teamwork	71111.12—Maintenance Effectiveness

The inspectors identified a Green, non-cited violation of Technical Specification 5.4.1.a, "Procedures," for the licensee's failure to establish, implement, and maintain procedures associated with door maintenance. Specifically, the licensee failed to establish, implement, and maintain maintenance procedures for doors that provide safety-related functions such as ventilation pressure boundaries. As a result, 15 safety-related doors were identified that either had degraded conditions or that did not have a periodic maintenance task to inspect the doors.

Description:

On March 7, 2018, the inspectors toured the Auxiliary Building 2047' elevation and identified a degraded door seal on door DSK15121, associated with control room air conditioning units. The inspectors shared their observations with the licensee and Condition Report 201801220 was written to document and correct this issue. The inspectors noted that some doors in this area of the plant interface with the control room ventilation boundary and serve a safety-related barrier function for ventilation to the control room during postulated accidents. The inspectors reviewed licensee Procedure MPM-SK-QW001, "Service and Inspection of Plant Doors," Revision 0, and challenged the licensee on preventative maintenance inspections for safety-related and non-safety doors.

As a result, the licensee performed an extent of condition review for door degradations. The inspectors, in parallel and independently of the licensee, performed a review of preventative maintenance on doors that provide safety-related functions. These reviews revealed 33 safety-related and non-safety related doors had degraded conditions or that did not have a periodic maintenance task to inspect the doors. Note that the degraded conditions included deficiencies that were not previously identified prior to this extent of condition review. The degraded conditions varied from missing seals, gaps due to door deformation, loose hardware, and other low level issues across several safety-related areas of the plant. These areas included the auxiliary building, the control building, and the fuel building. Of those 33 doors, 15 were safety-related with the remainder predominantly serving as fire barriers.

The summary of these issues are included in the table below.

Door DSK$_{nnnnn}$ [S] safety-related	**Degraded condition**	**No periodic maintenance**	**CR Numbers 20180nnnn**
11021 [S]	X		1394
11194 [S]	X		1364
11195 [S]	X	X	1394, 1773
11273 [S]	X		1394
13011 [S]		X	1773
13012 [S]	X	X	1394, 1773
13291 [S]	X		1394
14031	X		1591
14052	X		1591
14081 [S]	X		1364
14091	X		1591
14102	X		1591
14133	X		1358
15012	X		1591, 1219
15031	X		1363
15041 [S]	X		1394
15071 [S]	X		1364
15121	X		1220, 1315, 1581
15131	X		1329, 1581
21011 [S]	X		1394
31041 [S]	X		1394
32013 [S]		X	1773
32242	X	X	1394, 1773
33011	X		1591
33023	X		1591
33044 [S]	X		1394
34041	X		1591
36161	X		1331
36092	X		1331
41011 [S]	X		1394
61011	X	X	1364, 1773
61021	X		1364
61022		X	1773

Further, the licensee initiated Condition Report 201801513, to document design discrepancies in the definition of “air tight” across various plant doors.

In each safety-related case, the licensee entered the issue into the corrective action program and was able to demonstrate operability of the associated structures, systems, and components.

The inspectors concluded the licensee failed to establish, implement, and maintain maintenance procedures for doors that provide safety-related functions such as ventilation pressure boundaries. Further, the inspectors determined the issue was programmatic across several safety-related areas of the plant and functions performed by the doors.

As an example of the failure to maintain door maintenance procedures, step 2 of Procedure MPM-SK-QW001, Addendum 5, “Service and Inspection of Pressure Doors,” Revision 0, states, “the procedure applies to doors listed in Attachment 1 of this procedure.” Safety-related door DSK11195 is listed in Attachment 1 but the requirement to perform preventative maintenance was not translated to a recurring job. As a result, there was no preventative maintenance task assigned to inspect the door; although, the program required it. This issue was captured under Condition Report 201801773. When the lack of preventative maintenance was identified, the licensee inspected the door and found material deficiencies. This issue was captured under Condition Report 201801394. This is one example of the issues summarized in the table above.

The inspectors noted that the procedural guidance for maintenance technicians working on doors did not match up to engineering’s threshold for identifying issues that could be adverse. For example, Section 5.1 of Addendum 5 of Procedure MPM-SK-QW001 allows maintenance technicians to perform “minor maintenance” to correct deficiencies found and only requires a condition report be written “if a condition is identified which affects the capability of the door to function as designed.” Further, a sampling of jobs to perform safety-related door maintenance, such as Job 17513036, have a generic note stating, “minor door seal damage is acceptable.” Conversely, engineering tracks openings in ventilation pressure boundaries to the units of 0.1 inches squared under equipment out of service logs (EOSLs) such as EOSL 16429. This EOSL is a living document that aggregates known deficiencies in ventilation pressure boundaries in order to preserve the calculated margin of design basis heating, ventilation, and air conditioning (HVAC) systems. The inspectors determined there was inadequate communication across engineering and maintenance in order to preserve design assumptions for safety-related HVAC.

Corrective Actions: The licensee performed a walk-down of safety-related and non-safety doors, a review of safety-related door maintenance procedures, and entered issues into the corrective action program.

Corrective Action Reference: Condition Report 201803204

Performance Assessment:

Performance Deficiency: The failure to establish, implement, and maintain maintenance procedures for doors that provide safety-related functions such as ventilation pressure boundaries was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor, and therefore a finding, because it adversely affected the structure, system, and component, and the barrier performance attribute of the Barrier Integrity Cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the licensee identified 15 safety-related doors that either had deficiencies that were not previously identified during inspections or that did not have a periodic preventative maintenance task to inspect the doors. Further, the inspectors determined the issue was programmatic across several safety-related areas of the plant and functions performed by the doors.

Significance: Using Inspection Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 3, "Mitigating Systems Screening Questions," dated June 19, 2012, the inspectors determined that the finding was of very low safety significance (Green) because the finding only represented a degradation of the radiological barrier function provided for the control room, or auxiliary building, or spent fuel pool.

Cross-cutting Aspect: The finding had a cross-cutting aspect in the area of human performance associated with teamwork because the licensee failed to ensure individuals and work groups communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained [H.4].

Enforcement:

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 Appendix A of Regulatory Guide 1.33, Revision 2. Section 9.a of Appendix A to Regulatory Guide 1.33, Revision 2, requires maintenance that can affect the performance of safety-related equipment should be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. The licensee established Procedure MPM-SK-QW001, "Service and Inspection of Plant Doors," Revision 0, and associated addendums, in part, to meet the regulatory requirement. Step 2 of Procedure MPM-SK-QW001, Addendum 5, "Service and Inspection of Pressure Doors," Revision 0, states "the procedure applies to doors listed in Attachment 1 of this procedure."

Contrary to the above, prior to March 7, 2018, the licensee failed to apply the procedure to doors listed in Attachment 1 of Procedure MPM-SK-QW001, Addendum 5. As a result, the licensee failed to establish, implement, and maintain procedures for preventative maintenance that can affect the performance of safety-related pressure doors. Consequently, 15 safety-related doors were identified that either had degraded conditions or that did not have a periodic maintenance task to inspect the doors.

Disposition: This violation is being treated as a non-cited violation consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Critique an Inaccurate Emergency Classification During a Simulator Training Scenario			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Emergency Preparedness	Green NCV 05000483/2018002-03 Closed	P.6—Self-Assessment	71114.05—Maintenance of Emergency Preparedness

The inspectors identified a non-cited violation of 10 CFR 50.47(b)(14) for the licensee's failure to critique an inaccurate emergency classification made during licensed operator training.

Description:

The inspectors reviewed records from a licensed operator training session conducted in the control room simulator on May 31, 2017. The inspectors determined that the scenario was designed to provide conditions leading to emergency action level SA9.1, hazards affecting a safety system. The records indicated that the shift manager incorrectly declared emergency action level FA1.1, loss of one fission product barrier, based on a belief that a reactor coolant system leak was in progress. When the shift manager informed the operations crew of the declaration, the crew informed the shift manager that the leak was not from the reactor coolant system. The shift manager reassessed conditions and subsequently declared emergency action level SA9.1. The correct classification was made within 15 minutes of conditions occurring which required classification and notifications made to offsite authorities. The licensee evaluated the shift manager's performance as accurate and reported the associated drill and exercise performance indicator opportunity to the NRC as a success.

The inspectors determined that the shift manager's performance was not accurate and the declaration of emergency action level FA1.1 should have been determined to be a performance weakness in accordance with Emergency Preparedness Frequently Asked Question 13-07, dated April 1, 2014. The frequently asked question states that the initial declaration at an emergency classification level is to be evaluated for accuracy and that a subsequent correction does not negate an inaccurate initial declaration.

Corrective Actions: The licensee plans to correct the performance indicator submission to the NRC for Second Quarter 2017 and perform a human performance analysis for shift managers and emergency operations facility emergency coordinators.

Corrective Action Reference: Condition Report 201802099

Performance Assessment:

Performance Deficiency: The failure to critique an inaccurate emergency classification made during licensed operator training was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely affected the Emergency Preparedness Cornerstone attribute of the emergency response organization's performance. The licensee may not be capable of taking adequate measures to protect the health and safety of the public if they do not maintain the emergency response organization's ability to recognize emergency classifications.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Appendix B, "Emergency Preparedness Significance Determination Process," dated September 22, 2015. The finding was determined to be of very low safety

significance (Green) because it was a failure to comply with NRC requirements, was not a lost or degraded risk-significant planning standard function, and was not a loss of planning standard function. The finding was not a loss of planning standard function because the failure to critique occurred in a drill with limited evaluation.

Cross-cutting Aspect: The licensee failed to routinely conduct self-critical and objective assessments of its practices. Specifically, evaluators for a licensed operator training session were not self-critical about the classification of emergency events. The evaluators failed to recognize that the initial declaration of an emergency classification was required to be evaluated and that subsequent correction of an inaccurate declaration did not create a successful performance indicator opportunity [P.6].

Enforcement:

Violation: Title 10 CFR 50.47(b)(14) requires, in part, that deficiencies identified as a result of drills or exercises will be corrected.

Contrary to the above, on May 31, 2017, the licensee failed to correct a deficiency occurring in a drill. Specifically, the licensee failed to identify the declaration of an emergency classification as inaccurate and subsequently failed to correct the inaccurate performance.

Disposition: This violation is being treated as a non-cited violation consistent with Section 2.3.2 of the Enforcement Policy.

Failure of an Analysis of the Impact of Changes to Emergency Action Levels to Demonstrate the Changes did not Reduce the Effectiveness of the Emergency Plan

Cornerstone	Significance	Cross-cutting Aspect	Report Section
Emergency Preparedness	Green NCV 05000483/2018002-04 Closed	H.14—Conservative Bias	71114.05—Maintenance of Emergency Preparedness

The inspectors identified a non-cited violation of 10 CFR 50.54(q)(3), for the failure of an analysis of the impact of changes to licensee emergency action levels to demonstrate that the changes did not reduce the effectiveness of the emergency plan.

Description:

The inspectors reviewed analysis in 5054Q Assessment 2017027 for the impacts of a change to the emergency plan Procedure EIP-ZZ-00101, Addendum 2, “Emergency Action Level Technical Bases Document,” Revision 13, dated December 12, 2017. The licensee implemented the emergency action level changes on March 29, 2018. The inspectors noted that, in part, the emergency action level changes included a revised threshold for radiation monitors GT-RE-59 and GT-RE-60 in the fission product barrier initiating conditions.

The analysis of the change identified that the licensee used NUREG-1940, “RASCAL 4: Description of Models and Methods,” dated December 2012 as the basis for the calculations which determined the revised radiation monitor thresholds. The analysis also identified that previous calculations for these radiation monitors were based on the licensee’s Final Safety Analysis Report (FSAR). The licensee’s stated basis for using NUREG-1940 was that it provided a source term that was more averaged over a spectrum of accidents and core conditions than a source term derived from the FSAR.

The inspectors discussed Assessment 2017027 with the licensee. The licensee stated that NEI 99-01, “Development of Emergency Action Levels for Non-Passive Reactors,” Revision 6, dated November 2012 did not specify how to develop the source term(s) used to calculate radiological emergency action levels. Also, the use of NUREG-1940 to develop the radiological source term did not need to be justified because it was an NRC authored document. In addition, the licensee believes that the use of NUREG-1940 was acceptable to the NRC because other licensees had used NUREG-1940 to develop emergency action levels and those emergency action levels were approved as license amendments.

The inspectors reviewed a comparison of the assumed concentration of 15 isotopes listed in the FSAR to the assumed concentration of the same isotopes in the source term derived from NUREG-1940 and identified minor differences not likely to result in significant inaccuracies in the calculated radiation monitor thresholds. However, the source term used by the licensee also included radioactive isotopes not present in the FSAR, in the form of radioactive particulates. The licensee’s analysis did not address the effect of including these additional isotopes in calculations.

The inspectors concluded that the licensee could not adopt radiological source terms derived from NUREG-1940 without justifying why the derived radiological source term resulted in a more accurate calculation of emergency action levels than calculations derived from the source term specified in the FSAR. Further, the inspectors did not identify a valid justification for the use of NUREG-1940 in the regulatory analysis, dated December 12, 2017. As a result, the licensee failed to demonstrate the proposed change would not be a decrease in effectiveness.

Corrective Actions: The issue is not an immediate safety concern because the revisions to radiation monitor thresholds in the emergency action levels do not differ significantly from what the thresholds would have been had the FSAR source term been used as the basis for the calculation. The licensee will evaluate appropriate corrective actions in Condition Report 201802128.

Corrective Action Reference: Condition Report 201802128

Performance Assessment:

Performance Deficiency: The failure of the licensee’s 5054Q Assessment 2017027 to demonstrate the proposed emergency plan change did not reduce the effectiveness of the emergency plan was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely affected the Emergency Preparedness Cornerstone attribute of procedure quality (emergency action level changes, plan changes). A licensee may not be capable of implementing adequate measures to protect the health and safety of the public if the licensee fails to demonstrate that changes made to its emergency plan and emergency action levels do not reduce the effectiveness of the emergency plan.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Appendix B, “Emergency Preparedness Significance Determination Process,” dated September 22, 2015. The finding was determined to be of very low safety significance (Green) because it was a failure to comply with NRC requirements not associated with the emergency preparedness planning standards.

Cross-cutting Aspect: The licensee failed to demonstrate a conservative bias in making the choice of radiological source terms to use as the basis for calculating emergency action level thresholds. Specifically, the licensee did not demonstrate that use of a radiological source term deviating from its approved site FSAR provided a more accurate calculational basis before performing the calculation [H.14].

Enforcement:

Violation: Title 10 CFR 50.54(q)(3) requires, in part, that a licensee make changes to its emergency plan without NRC approval only if the licensee performs an analysis demonstrating that changes do not reduce the effectiveness of the plan.

Contrary to the above, on December 12, 2017, the licensee made changes to its emergency plan without NRC approval, but failed to perform an analysis demonstrating the changes did not reduce the effectiveness of the plan. Specifically, the licensee's analysis of changes to Procedure EIP-ZZ-00101, Addendum 2, "Emergency Action Level Technical Bases Document," Revision 13, did not demonstrate that use of a radiological source term derived from NUREG-1940 resulted in a more accurate calculation of emergency action level thresholds than would a calculation based on the approved site FSAR.

Disposition: This violation is being treated as a non-cited violation consistent with Section 2.3.2 of the Enforcement Policy.

Observation	71152—Problem Identification and Resolution

The inspectors reviewed the licensee's corrective action program, performance indicators, system health reports, and other documentation to identify trends that might be indicative of a more significant safety issue for the emergency diesel generators.

The inspectors reviewed adverse issues for the safety-related emergency diesel generators (EDGs) identified between July 1, 2017, and June 30, 2018. During this period, 181 EDG condition reports were generated. Of these, 129 condition reports were related to program concerns, such as knowledge transfer, benchmarking, industry operating experience, Part 21 evaluations, review of industry inspection findings, procedural enhancements, reportability, and documentation of other items, such as chemistry results.

The inspectors focused on the remaining 52 condition reports that documented adverse material conditions and planning/scheduling issues. As one example of the adverse material condition reports, the inspectors reviewed 10 condition reports related to the crack discovery on the train B EDG #6 main saddle bearing identified in the fall 2017 refueling outage:

- Condition Report 201706169 identified excessive bearing clearance with the train B EDG #6 main saddle bearing and evaluated reportability
- Condition Report 201706217 generated to track degraded and non-conforming conditions identified during Refueling Outage 22
- Condition Report 201706244 documented the crack discovery on the train B EDG #6 main saddle bearing

- Condition Report 201706386 documented damage to the train B EDG from rigging gear during the bearing saddle replacement
- Condition Report 201706399 identified loose fasteners as a possible contributing factor to the cracked saddle bearing
- Condition Report 201706768 documented a water leak during the hydrostatic test following the train B main saddle bearing replacement
- Condition Report 201706884 identified maintenance trends on the train B EDG during Refueling Outage 22
- Condition Report 201706935 documented liquid dye penetrant testing on EDG bearings
- Condition Report 201707356 identified EDG indications for input to the operational decision making process
- Condition Report 201800907 documented Fairbanks-Morse evaluation of the cracked main saddle bearing

Similarly, the inspectors reviewed the remaining adverse material condition reports which covered a wide range of issues such as jacket water leakage, fuel oil leakage, fuel injector damage, degraded gaskets/o-rings, engine balancing, and foreign material exclusion in support systems.

In the work planning category, the licensee documented two issues with scheduling maintenance and one for work not ready to commence.

The inspectors verified that all issues were addressed within the scope of the corrective action program and that the completed and planned actions were appropriate to correct the identified causes. The inspectors noted that several of the adverse conditions identified were legacy issues or problems that the licensee corrected in order to restore the system. The inspectors did not identify any trends or concerns that might be indicative of a more significant safety issue for the EDGs.

Minor Violation	71153—Follow-up of Events and Notices of Enforcement Discretion

Minor Violation: Contrary to Technical Specification 3.6.3, Containment Isolation Valves, the licensee failed to maintain each containment isolation valve operable or enter applicable conditions and required actions for an inoperable containment isolation valve in Modes 1, 2, 3, and 4.

Specifically, the licensee failed to shut the reactor building service air header supply outer containment isolation valve KAV0118 after the fall 2017 refueling outage. As a result, isolation valve KAV0118 was left open from November 25, 2017, through January 11, 2018, which rendered the valve's containment isolation function inoperable. The as-found testing demonstrated that the overall containment isolation function, for that penetration, was met with inner containment isolation valve KAV0039 in the normally shut position. Additional information can be found in Licensee Event Report 05000483/2018-001-00, "Violation of

Technical Specification 3.6.3, “Containment Isolation Manual Valve Found in Open Position” (ADAMS Accession Number ML18071A208).

The licensee’s failure to comply with Technical Specification 3.6.3, Containment Isolation Valves, and maintain each containment isolation valve operable or enter applicable conditions and required actions for an inoperable containment isolation valve in Modes 1, 2, 3, and 4 was a performance deficiency.

Screening: The inspectors determined the performance deficiency was minor because it was not a precursor to a significant event, did not have the potential to lead to a more significant safety concern, did not relate to a performance indicator that would have exceeded a threshold and did not adversely impact any of the cornerstone objectives. Specifically, the as-found local leak rate testing demonstrated that containment isolation function was met with inner containment isolation valve KAV0039 in the normally shut position.

Enforcement: The failure to comply with Technical Specification 3.6.3, Containment Isolation Valves, and maintain each containment isolation valve operable or enter applicable conditions and required actions for an inoperable containment isolation valve in Modes 1, 2, 3, and 4 constitutes a minor violation that is not subject to enforcement action in accordance with the NRC’s Enforcement Policy.

MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

On April 27, 2018, the inspector presented the onsite emergency preparedness inspection results to Mr. T. Herrmann, Site Vice President, and other members of the licensee staff

On May 24, 2018, the inspectors presented the occupational radiation protection inspection results to Mr. B. Cox, Senior Director of Nuclear Operations, and other members of the licensee staff.

On July 10, 2018, the inspectors presented the integrated quarterly resident inspection results to Mr. M. McLachlan, Senior Director, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure 71111.01: Adverse Weather Protection

Procedures

Number	Title	Revision
APA-ZZ-00322, Appendix D	Work Control Center Organization and Operation	30
AUE-SWP-000001	Electrical Safe Work Practices Manual	3
OSP-NB-00001	Class 1E Electrical Source Verification	40
OTA-RK-00016, Add 18A	NB01 Bus Lockout	1
OTA-RK-00016, Addendum 18B	NB01 Bus Undervoltage	0
OTN-NB-0001A, Addendum 5	NB01 Loss of Power Recovery	0
OTO-NB-00001	Loss of Power to NB01	32

Condition Reports

201701792	201703756	201704460	201801310	201801801
201802663				

Inspection Procedure 71111.04: Equipment Alignment

Procedures

Number	Title	Revision
OSP-AL-00001	Auxiliary Feedwater Flow Paths Valve Alignment	10
OSP-EM-P001B	Safety Injection Train B Inservice Test	50
OTN-EF-00001	Essential Service Water System	75
OTN-EM-00001	Safety Injection System	38
OTN-NE-0001A	Standby Diesel Generation System – Train A	51
OTN-NE-0001B	Standby Diesel Generation System – Train B	54

Drawings

Number	Title	Revision
M-22EM01	High Pressure Coolant Injection Sheet 2	39
M-22EM02	High Pressure Coolant Injection Sheet 3	23

Condition Reports

201304555	201304556	201701643	201702416	201703110
201704176	201704872	201706589	201706812	201800063
201800516	201800747	201801015	201802184	201802218
201802593	201802598			

Jobs

16512414	16512503	17500445	17002539

Miscellaneous

Number	Title	Revision
RFR 15822	Evaluation of Safety Injection Test Line Valves Effects on System	A

Inspection Procedure 71111.05AQ: Fire Protection Annual/Quarterly

Condition Reports

201801761	201801925	201801983	201802068	201802161
201802699	201802736			

Miscellaneous

Number	Title	Revision
	Callaway Plant NFPA 805 Transition Report	
	Fire Preplan Manual	39

Inspection Procedure 71111.11: Licensed Operator Requalification Program and Licensed Operator Performance

Procedures

Number	Title	Revision
OTS-SF-00001	Control Rod Positioning	10

Condition Reports

201007073	201509093	201801808	201801994	201802028

Jobs

18504417

Miscellaneous

Number	Title
18-3	Annual exam scenarios and JPMs: Week of May 28, 2018

Inspection Procedure 71111.12: Maintenance Effectiveness

Procedures

Number	Title	Revision
APA-ZZ-00322	Integrated Work Management Process Description	20
APA-ZZ-00322, Appendix B	Work Week Schedule and Execution	56
APA-ZZ-00322, Appendix F	Online Work Integrated Risk management	16
APA-ZZ-00750	Hazard Barrier Program	41
MPM-SK-QW001	Service and Inspection of Plant Doors	0

Drawings

Number	Title	Revision
8618-X-95564	Interconnection Diagram Yard Startup Posn V42 Volt XFMR & 345KV Line Posn-V44	5

Condition Reports

201302050	201504242	201701364	201701738	201801120
201801329	201801394	201801773	201802057	201802749

Jobs

17501498

Miscellaneous

Number	Title	Revision
100073	IM JZ-72.6 Line Coupling Tuner	0

Inspection Procedure 71111.13: Maintenance Risk Assessment and Emergent Work Control

Procedures

Number	Title	Revision
APA-ZZ-00322	Integrated Work Management Process Description	20

Procedures

Number	Title	Revision
APA-ZZ-00322, Appendix F	Online Work Integrated Risk Management	16
APA-ZZ-00801	Foreign Material Exclusion	45
ETP-CH-ST001	EHC System Flush	1
OTN-CH-00001	Main Turbine Control Oil System	20

Drawings

Number	Title	Revision
M-22CH01	Main Turbine Hydraulic Control System Sheet 11	9

Condition Reports

201605024	201801712	201801754	201802018	201802052
201802080	201802284			

Jobs

15509648	15509653

Inspection Procedure 71111.15: Operability Determinations and Functionality Assessments

Procedures

Number	Title	Revision
APA-ZZ-00500	Operability and Functionality Determinations	32
BD-ES-0.2	Natural Circulation Cooldown	6, 7
DIESLE-EMER-0022	KJ Engine Fuel Rack Adjustment	1
ES-0.2	Natural Circulation Cooldown	13
ES-0.2	Natural Circulation Cooldown	14
MSM-KJ-QK001	Emergency Diesel Generator Inspection	40
MTM-KJ-QK001	Emergency Diesel Engine Disassembly, Inspection, and Reassembly	9
MTT-ZZ-00264	Removal and Replacement of ITT General Controls Hydramotor Actuators	24
ODP-ZZ-00001	Operator Burdens and Workarounds	9
ODP-ZZ-00027	Safety Function Determination Program	18

Procedures

Number	Title	Revision
OSP-KA-V003	Nitrogen Accumulator Inservice Leak Rate Test	30
OTN-GK-00001	Control Building HVAC System	53
OTO-GK-00001	Loss of Control Room HVAC	14

Drawings

Number	Title	Revision
E-23KJ07	Diesel Generator KKJ01B Governor Control	4
M-622.1-00023	Condensing Unit	19

Condition Reports

200706594	200900842	200903033	201007822	201408077
201704701	201801302	201801822	201802284	201802296
201802938				

Jobs

15004983	18001143

Miscellaneous

Number	Title	Revision
BB-175	Reactor Coolant System Cooldown Rate EOP Action Value 4	0
BB-175, Addendum 1	Maximum Cooldown Rate During a Natural Circulation Cooldown to Address Flow Stagnation Issues	0
KA-37	Backup Nitrogen Supply System Design Pressure Losses	0
M-018-00309	IM Emergency Diesel Generator System	138
M-622.1-00061, Table 001	Vendor manual: SGK04/SGK05	
ZZ-179	Plant AC Bus Load List	9
98-1031	Modification: Controllers for SGK05A and B	A

Inspection Procedure 71111.19: Post Maintenance Testing

Procedures

Number	Title	Revision
OTN-GK-00001	Control Building HVAC System	53

Condition Reports

201706582	201800921	201802463	201802854	201802895
201802071	201802090	201802093	201802114	201802123

Jobs

11506485	12500205	16510841	16511475	11513141
12002430	14508639			

Miscellaneous

Number	Title	Revision
GK-19	Calculation of DC and Engineered Safety Features Switchgear Room Heatup	0C
ULDBD-GK-001	Control Building HVAC System	1

Inspection Procedure 71111.22: Surveillance Testing

Procedures

Number	Title	Revision
ODP-ZZ-00029	RCS Leakage Action Level Guideline	7
OSP-BB-00009	RCS Inventory Balance	38
OSP-NE-0001A	Standby Diesel Generator A Periodic Tests	64
OTO-BB-00003	RCS Excessive Leakage	25
RRA-ZZ-00001	NRC Performance Indicator Program	9

Condition Reports

201503444	201707272

71114.02: Alert and Notification System Testing

Condition Reports

201700320	201700758	201702367	201703790	201704390	201707404
201707681	201800242	201800372	201800854		

Procedures

Number	Title	Revision
KSP-ZZ-00008	Tone Alert Radios	9
KSP-ZZ-00110	Siren Alerting System Testing	15

Miscellaneous

Number	Title	Date
	Annual Siren Maintenance Records for 2016	
	Annual Siren Maintenance Records for 2017	
	Callaway Plant Alert and Notification System Design Report	January 2017
WO16501542	2017 Tone Alert Radio Provider Audit	March 30, 2017
WO16502178	2017 Annual Tone Alert Radio Battery Distribution	March 28, 2017
WO17500804	Monthly Distribution of Tone Alert Radios	February 27, 2017
WO17503441	2018 Tone Alert Radio Provider Audit	February 12, 2018
WO17514077	Monthly Distribution of Tone Alert Radios	January 26, 2018

71114.03: Emergency Response Organization Staffing and Augmentation System

Condition Reports

201609198	201700307	201700316	201703154	201704382

Miscellaneous

Number	Title	Revision/Date
EIP-ZZ-00200	Augmentation of the Emergency Response Organization	21
KSP-ZZ-00201	Emergency Augmentation Drill, Test	10
WO16501826	ERO Augmentation Test for May 24, 2016	May 25, 2016
WO16506957	ERO Augmentation Test for September 8, 2016	September 8, 2016
WO16510907	ERO Augmentation Test for December 5, 2016	December 6, 2016

WO16510907	ERO Augmentation Test for December 12, 2016	December 13, 2016
WO16514135	ERO Augmentation Test for March 10, 2017	March 13, 2017
WO17502683	ERO Augmentation Test for June 13, 2017	June 15, 2017
WO17506126	ERO Augmentation Test for August 6, 2017	August 7, 2017
WO17508091	ERO Augmentation Test for December 11, 2017	December 12, 2017
WO17513914	ERO Augmentation Test for February 19, 2018	February 20, 2018

71114.04: Emergency Action Level and Emergency Plan Changes

Condition Reports

201802128

Miscellaneous

Number	Title	Date
EPCI 17-01	Calculation: Emergency Action Level Bases for Fuel Clad and Reactor Coolant System Barrier Loss, and Containment Barrier Potential Loss, Revision 1	November 22, 2017

71114.05 - Maintenance of Emergency Preparedness

Condition Reports

201700110	201700307	201700316	201700777	201700937	201701166
201701250	201701281	201701426	201702193	201702223	201702225
201702280	201702286	201702289	201702299	201702327	201702736
201703430	201703570	201703778	201703986	201704138	201704382
201705732	201802054	201802061	201802099	201802095	201802096
201802127	201802128				

Work Orders

15505575	16501542	16502178	16506313
16508073	16510372	16510907	16511006
16512796	16513033	16513811	17501138
17503441	17503557	17507733	

Miscellaneous

Number	Title	Revision/Date
	Callaway Plant Radiological Emergency Response Plan	50
	Evaluation Report for the Radiation Monitoring Drill conducted June 16, 2016	
	Evaluation Report for the Radiological Monitoring Drill conducted September 1, 2016	
	Evaluation Report for the Health Physics Drill conducted September 8, 2016	
	Evaluation Report for the Contaminated Victim Drill conducted November 8, 2016	
	Evaluation Report for the Health Physics Drill conducted March 7, 2017	
	Evaluation Report for Exercises conducted First Quarter 2017 (January 19, January 26, February 2, February 9, February 16, February 23)	March 28, 2017
	Evaluation Report for the Exercise conducted March 7, 2017	May 10, 2017
	Evaluation Report for the Exercise conducted April 25, 2017	June 30, 2017
	Evaluation Report for the Exercise conducted June 29, 2017	August 23, 2017
	Evaluation Report for the Health Physics Drill conducted August 2, 2017	
	Evaluation Report for the Contaminated Victim Drill conducted August 31, 2017	
	Evaluation Report for Exercises conducted Third Quarter 2017 (July 20, July 27, August 3, August 10, August 17, and August 24)	October 5, 2017
	Evaluation Report for Exercises conducted First Quarter 2018 (January 18, January 25, February 1, February 8, and February 15)	April 10, 2018
A210.0012	Operating Quality Assurance Manual	32A

ADCN 2-201702736 (AUCA2017002)	Performance Deficiencies with Emergency Classifications and Notifications	July 2017
CR201704138	Common Cause Evaluation	
CR201700937	Common Cause Analysis of Sentry Failures	September 8, 2017
DTI-040	NOS Performance Assessments	9
EIP-ZZ-A0020	Maintaining Emergency Preparedness	31
EIP-ZZ-A0066	RERP Training Program	24
KDP-ZZ-00013	Emergency Response Facility and Equipment Evaluation	15
KDP-ZZ-00013, Appendix 1	Equipment Important to Emergency Response Matrix	5
KDP-ZZ-00400	RERP Impact Evaluations and Changes	25
KDP-ZZ-02001	Drill and Exercise Program	24
KSP-ZZ-00004	Emergency Response Facilities	4
KSP-ZZ-00007	Offsite Effectiveness of the Emergency Preparedness Program	14
KSP-ZZ-00102	Monthly Emergency Communications Testing	14
KSP-ZZ-00103	Quarterly Emergency Communications Testing	5
KSP-ZZ-00602	Verification of Emergency Instruction Postings	4
OQC20170006	First Trimester 2017 Nuclear Oversight Performance Report	June 19, 2017
OQC20170013	Second Trimester 2017 Nuclear Oversight Performance Report	October 6, 2017
OQC20170017	Third Trimester Nuclear Oversight Performance Report	January 31, 2018
SBM-201720060-01	Benchmark Trip Report: Palo Verde JIC Operations	February 8, 2017
SBM-201820044-011	Benchmark Trip Report: Peer Evaluator for the Diablo Canyon QV Audit	April 4, 2018

SP17004	Emergency Preparedness 12-month Program Review	October 24, 2017
SSA-201600059-51	Simple Self-Assessment: Pre-NRC Program Inspection, IPX Exercise	March 13, 2017
SSA-201720039-009	Simple Self-Assessment: Implementation of ACAD-15-010, Guidelines for the Training and Qualification of Emergency Response Personnel	
WO16506313	2017 Annual ETE Update	April 19, 2017
	2018 Annual ETE Update	April 10, 2018
WO16510372	Annual Media Briefing Program	August 9, 2017
WO16511006	2017 Annual Review of EALS with State	August 28, 2017
WO16511251	Monthly Emergency Communications Testing	March 1, 2017
WO16511926	Monthly Emergency Communications Testing	November 3, 2016
WO16512796	Annual Radio Communications Test	October 27, 2017
WO16513033	Monthly Source Checks	December 2, 2017
WO16513082	Monthly Emergency Communications Testing (BURS Retest)	November 10, 2016
WO16513811	Monthly Process Radiation Monitor Source Checks	December 28, 2016
WO16514038	Evaluation Report for the Radiological Monitoring Drill conducted June 29, 2017	
WO16514287	Monthly Emergency Communications Testing	January 4 2017
WO17500337	Emergency Facility Readiness Inspection	April 10, 2017
WO17501138	Callaway County Hospital Inventory/Inspection	July 26, 2017
WO17503557	SGTR Monitor Source Checks	May 1, 2017
WO17504722	Monthly Emergency Communications Testing	June 7, 2017
WO17507733	Saint Mary’s Hospital Inventory/Inspection	December 27, 2017
WO17509367	Monthly Emergency Communications Testing	October 4, 2017
WO17513572	Monthly Emergency Communications Testing	January 3, 2018

5054Q Assessment 2017010	KSP-ZZ-00008, Revision 8	March 16, 2017
5054Q Assessment 2017016	EIP-ZZ-PR020, Revision 40	May 19, 2017
5054Q Assessment 2017017	KDP-ZZ-00013, Appendix 1, Revision 5	October 3, 2017
5054Q Assessment 2017018	KDP-ZZ-02001, Revision 23	August 8, 2017
5054Q Assessment 2017019	KDP-ZZ-02001, Revision 23	August 8, 2017
5054Q Assessment 2017024	RERP Revision 49	August 23, 2017
5054Q Assessment 2017026	ERO Duty Responders	August 23, 2017
5054Q Assessment 2017027	EIP-ZZ-00101, Addendum 2, Revision 13	November 28, 2017
5054Q Assessment 2017036	EIP-ZZ-00101, Revision 54	September 26, 2017
5054Q Assessment 2017055	EIP-ZZ-00101, Addendum 2, Revision 14	March 19, 2018
5054Q Assessment 2017088	EIP-ZZ-00245, Addendum B, Revision 4	March 23, 2018
5054Q Assessment 2018010	CR-201800454	February 7, 2018
5054Q Assessment 2018013	EIP-ZZ-00101, Addendum 2, Revision 14	March 19, 2018
5054Q Assessment 2018014	EIP-ZZ-00101, Addendum 2, Revision 14	March 19, 2018
5054Q Assessment 2018015	EDP-ZZ-00005, Revision 14	March 21, 2018

Inspection Procedure 71114.06: Drill Evaluation

Procedures

Number	Title	Revision
EIP-ZZ-A0001	Emergency Response Organization	19
EIP-ZZ-A0066	Radiological Emergency Response Plan Training	24
EIP-ZZ-00101	Classifications of Emergencies	54
OTO-MA-00008	Rapid Load Reduction	36
OTG-ZZ-00004	Power Operations	97
OTO-ZZ-00012	Severe Weather	39

Condition Reports

200500736	200711355	201105132

Miscellaneous

Number	Title	Revision
NUREG-1022	Event Reporting Guidelines 10CFR50.72 and 50.73	3

71124.02: Occupational ALARA Planning and Controls

Procedures

Number	Title	Revision
APA-ZZ-00014	Conduct of Operations – Radiation Protection	23
APA-ZZ-00014	Appendix A – Radiation Protection Skill of the Craft	3
APA-ZZ-01000	Callaway Energy Center Radiation Protection Program	45
APA-ZZ-01001	Callaway Plant ALARA Program	26
APA-ZZ-01004	Radiological Work Standards	31
APA-ZZ-01004	Appendix D – General instruction for Use of DLR	3
APA-ZZ-01400	Performance Improvement Program Appendix H – Performance Review Group	20
HDP-ZZ-01100	ALARA Planning and Review	23
HDP-ZZ-01200	Radiation Work Permits	33

Audits and Self-Assessments

Number	Title	Date
	Radiation Protection Performance Review Group Meeting	February 28, 2018

	Callaway Energy Center Refuel 22 Dose and Source Term Comparison Report	January 10, 2018
SP17006	Nuclear Oversight Performance Assessment of RF22	February 14, 2018

Condition Reports

201705692	201705803	201706722	201801083	201802051
201800459				

Radiation Work Permits

Number	Title	Revision
18502032	Change SFP Clean-Up Filter 2018	
17507741	Change SFP Clean-Up Filter 2017	
16511578750	RF22 Scaffold All	1
R22RPCOVRB	Refuel 22 Radiation Protection Job Coverage	
R22HDLIPREP	Refuel 22 Support Lower Core Barrel Movements	1
13004049	Replace Valve Packing in BGHV8160	
13004049EM	Emergent Work to Replace Solenoid and Testing	2
R221124AOV	AOV Re-Work and Tests	
R22AMHDLIFT	Ameren Personnel Head Lift	1
R22AMHDSET	Ameren Personnel Head Set	
R22HDLIFT	Perform Reactor Vessel Head Lift	
R22AMHDPREP	Ameren Personnel UI and Head Lift/Set Preps	1

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

Number	Title	Date
R22-50101	Radiation Protection Routine Activities Reactor Building	March 1, 2018
R22-56321	Remove/Reinstall Reactor Vessel Lower Internals	March 12, 2018
R22-55320	Reactor Building Head Lift	March 12, 2018
R22 CRANEVLV WORK	Crane Valve Work	March 12, 2018
R22-55220	Ameren Work in Cavity	March 12, 2018

Miscellaneous

Callaway Energy Center Long Range Dose and Source Term Reduction Plan

Callaway Energy Center Long Range Dose and Source Term Reduction Plan Completed Initiatives

71124.04 - Occupational Dose Assessment

Procedures

Number	Title	Revision
APA-ZZ-00014	Conduct of Operations – Radiation Protection	23
APA-ZZ-01000	Callaway Energy Center Radiation Protection Program	45
APA-ZZ-01001	Callaway Plant ALARA Program	26
HDMZZ-01300	Callaway Internal Dose Assessment Guidelines	0
HDP-ZZ-01300	Internal Dosimetry Program	34
HDP-ZZ-04700	Count Room and Whole Body Counter Quality Control Program	22
HDP-ZZ-08000	Respiratory Protection Program	23
HTP-ZZ-01302-DTI-DPW	Response to Positive In Vivo Count for Declared Pregnant Woman	6
HTP-ZZ-01433	Personnel Exposure Records	61
HTP-ZZ-04175-DTI-PM12-OP	Thermo Scientific Model PM-12 Personal Monitor Operation	9
HTP-ZZ-04564	APEX Suite Operations	16
RP-DTI-In Vitro Bioassay	In-Vitro Bioassay Sample Collection	3
RP-DTI-TRU Assessment	Alpha Monitoring Facility Characterization	7

Audit and Self-Assessments

Number	Title	Date
SP17006	Nuclear Oversight Performance Assessment of Refuel 22 Execution	February 14, 2018
AP17001	Nuclear Oversight Audit of Radiation Protection	February 28, 2017
SR-2016-30	Exelon Supplier Audit: Landauer, Inc.	August 26, 2016

Condition Reports

201700049	201700086	201700188	201700455	201700459
201700831	201700894	201702031	201702125	201702131
201702338	201702649	201702839	20173330	201703773
201703856	201707727	201800454	201800852	201801083
201801132				

Calibration Records

Number	Title	Date
FS-5301-HP	Canberra FastScan WBC System (at CPF)	September 21, 2016
FS-5300-HP	Canberra FastScan WBC system (at Annex Building)	September 22, 2016
PM-4053-HP	ThermoFisher PM-12	July 5, 2017
PM-4046-HP	ThermoFisher PM-12	September 2, 2017
WBC-6000-HP	Canberra In Vivo Chair Counter	July 14, 2017
FS-5300-HP	Canberra FastScan WBC System Confirmation Count	March 12, 2018
PM-4047-HP	ThermoFisher PM-12	April 11, 2018

Radiological Surveys

Number	Title	Date
CA-M-20180319-5	NS-1 Neutron Source – Quarterly Routine	March 19, 2018
CA-M-20180507-12	1311 SJ Room Monthly Routine Survey	May 7, 2018

Miscellaneous

Number	Title	Date
	NVLAP Certificate of Accreditation: Landauer, Inc.	January 1, 2018
DAW CYC 21	WMG Nuclide Distribution Report	November 13, 2017
HPCI 0202-02	Callaway Electronic Dosimeter Calibration Adjustment Factor	April 18, 2016
H230.0078	Personnel Dosimetry Data: SMD/TLD Results January 1 – December 31, 2017	January 3, 2018
H230.0078	Personnel Dosimetry Data: SMD/TLD Results January 22 – March 5, 2018	March 14, 2018

Inspection Procedure 71151: Performance Indicator Verification

Procedures

Number	Title	Revision
EIP-ZZ-00101	Classification of Emergencies	54
EIP-ZZ-00201	Notifications	51
EIP-ZZ-00212	Protective Action Recommendations	30
KDP-ZZ-02000	NRC Performance Indicator Data Collection	18
KSP-ZZ-00110	Siren Alerting System Testing	15

Condition Reports

201700346	201702225	201702367	201702891	201703430
201703986	201704380	201707404	201707681	201800242
201800372				

Miscellaneous

Number	Title	Date
	NRC Performance Indicator Transmittal Reports, Mitigating Systems Cornerstone	2017-2018
	NRC Performance Indicator Transmittal Reports, Barrier Integrity Cornerstone	2017-2018

Inspection Procedure 71153: Follow-up of Events and Notices of Enforcement Discretion

Procedures

Number	Title	Revision Date
APA-ZZ-00099 Appendix 2	Plant Status Control Investigations	
OTG-ZZ-00001	Plant Heatup Cold Shutdown to Hot Standby	89
OTG-ZZ-00001	Plant Heatup Cold Shutdown to Hot Standby	90
OTG-ZZ-00006	Plant Cooldown Hot Standby to Cold Shutdown	79
OSP-GP-00001	Containment Isolation Verification	24
ODP-ZZ-00014	Operational Mode Change Requirements	53
ODP-ZZ-00036	Technical Specification Application for Containment Isolation Valves	7
OSP-GT-00003	Containment Closure	21

Drawings

Number	Title	Revision
M-22KA02	Piping and Instrumentation Diagram Compressed Air System (Service Air)	27

Condition Reports

201800194	201802608	201408376	201800202

Jobs

18000323

Miscellaneous

Number	Title	Revision
AUCA 2018-0001	Root Cause Analysis for CAR 201800194 KAV0118 Found Open	0

Initial Request for Information
Quarterly Baseline Inspection
Callaway Plant

Inspection Report: 05000483/2018002

Inspection Dates: April 1 – June 30, 2018

Inspection Procedure: IP 71111 series, IP 71151, IP 71152

Lead Inspector: Dan Bradley, Senior Resident Inspector

Information Requested For 2nd Quarter 2018

The following information should be sent to the resident office in electronic format (Certrec IMS preferred) to the attention of Dan Bradley by April 13, 2018. Please provide requested documentation electronically in "pdf" files, Excel, or other searchable formats, if possible. The information should contain descriptive names and be indexed or hyperlinked to facilitate ease of use. If requested documents are large and/or only hard copy formats are available, please inform the inspector for clarification.

Please provide the following information for the **Auxiliary Feedwater (AL) system**:

1. A list of all calculations and drawings associated with the selected system.

2. A list of condition reports associated with the selected system for the last 3 years.

3. A list of work orders associated with the selected system for the last 3 years, including all open work orders.

4. A list of any pre-existing evaluations or calculations with low design margins for the selected system.

5. A list of maintenance rule components and functions; based on engineering or expert panel judgment, for the selected system.

6. A list of maintenance rule functional failure evaluations for the last 3 years for the selected system.

7. A list of operating experience evaluations for the last 3 years for the selected system.

8. A list of all procedures and calculations that involve time-critical operator actions.

9. A list of permanent and temporary modifications performed in the past 3 years for the selected system. Include a list of any documents associated with modifications such as: calculations, specifications, vendor manuals, Final Safety Analysis Report, Technical Specifications and Bases updates, updated procedures, and maintenance and surveillance activities and procedures.

10. A list of root cause and apparent cause evaluations associated with component failures or design issues initiated/completed in the last 3 years for the selected system.

11. A list of any common-cause failures of components in the last 3 years for the selected system.

12. An electronic copy of the design bases documents for the selected system.

13. An electronic copy of the system health notebooks for the selected system.

Additionally, please provide the basis documents used to compute or establish the following NRC Performance Indicators (PIs) for the most recent 4 quarters which data is available:

a) MS-05: Safety System Functional Failures (SSFF)

b) MS-08: MSPI Heat Removal Systems

c) BI-02: Reactor Coolant System Leak Rate Sample

Inspector Contact Information:

Dan Bradley
Senior Resident Inspector
573-676-3181
Dan.Bradley@nrc.gov

Mailing Address:
U.S. NRC Resident Inspector Office
8201 NRC Road
Steedman, MO 65077

The following items are requested for the
Occupational Radiation Safety Inspection
at Callaway
(May 21 – 25, 2018)
Integrated Report 2018002

Inspection areas are listed in the attachments below.

Please provide the requested information on or before
April 30, 2018.

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.0**1** 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 Natasha Greene at (817) 200-1154 or natasha.greene@nrc.gov. The other inspector is undetermined at this time.

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 16, 2017

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 sub-tiered 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: November 7, 2016

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 date of last inspection, 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 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

CALLAWAY PLANT - NRC INTEGRATED INSPECTION REPORT 05000483/2018002 – August 8, 2018

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