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

November 8, 2021

Mr. Fadi Diya,
Senior Vice President
and Chief Nuclear Officer
Ameren Missouri
Callaway Plant
8315 County Road 459
Steedman, MO 65077

SUBJECT: CALLAWAY PLANT – INTEGRATED INSPECTION REPORT 05000483/2021003

Dear Mr. Diya:

On September 30, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Callaway Plant. On October 6, 2021, the NRC inspectors discussed the results of this inspection with Mr. F. Bianco, Senior Director Nuclear Operations and Plant Manager, and other members of your staff. The results of this inspection are documented in the enclosed report.

Two findings of very low safety significance (Green) are documented in this report. These findings involve violations of NRC requirements. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or the significance or severity of the violations documented in this inspection report, 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 Callaway Plant.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the 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 Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

Signed by Haire, Mark
on 11/08/21

Gregory E. Werner, Chief
Reactor Projects Branch B
Division of Reactor Projects

Docket No. 05000483
License No. NPF-30

Enclosure:
Inspection Report 05000483/2021003

cc w/ encl: Distribution via Listserv

CALLAWAY PLANT – INTEGRATED INSPECTION REPORT 05000483/2021003 DATED - NOVEMBER 8, 2021

DISTRIBUTION:
SMorris, ORA
JMonninger, ORA
TVegel, DRP
MHay, DRP
RLantz, DRS
JDixon, DRS
RWilliams, RIV/OEDO (Robert)
VDricks, ORA
LWilkins, OCA
MChawla, NRR
AMoreno, RIV/OCA
BMaier, RSLO
FRamirez, IPAT
GWerner, DRP
DProulx, DRP
JMelfi, DRP
HStrittmatter, DRP
ASmallwood, DRP
DBradley, DRP
SJanicki, DRP
DYancey, DRP
LFlores, IPAT
BCorrell, IPAT
R4Enforcement

ADAMS ACCESSION NUMBER: ML21306A347

X SUNSI Review By: DLP	ADAMS: **X** Yes ☐ No	☐ Sensitive **X** Non-Sensitive	☐ Non-Publicly Available **X** Publicly Available	Keyword NRC-002

OFFICE	SRI/DRP/B	RI/DRP/B	ATL:DRS/IPAT	C:/DRS EB1	C:DRS/EB2
NAME	DBradley	SJanicki	FRamirez	VGaddy	NTaylor
SIGNATURE	*/RA/*	*/RA/*	*/RA/*	*/RA/*	*/RA/*
DATE	11/5/2021	11/5/2021	11/5/2021	11/5/2021	11/5/2021

OFFICE	C:DRS/OB	DRS/RCB	SPE:RPBB	DRP/C:RPBB
NAME	HGepford	MHaire	DProulx	GWerner/MHaire for
SIGNATURE	*/RA/*	*/RA/*	*/RA/*	*/RA/*
DATE	11/5/2021	11/5/2021	11/5/2021	11/8/2021

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	05000483
License Number:	NPF-30
Report Number:	05000483/2021003
Enterprise Identifier:	I-2021-003-0030
Licensee:	Ameren Missouri
Facility:	Callaway Plant
Location:	Steedman, MO
Inspection Dates:	July 1 through September 30, 2021
Inspectors:	R. Alexander, Senior Emergency Preparedness Inspector D. Bradley, Senior Resident Inspector J. Braisted, Reactor Inspector R. Fanner, Operations Engineer M. Hayes, Operations Engineer S. Hedger, Emergency Preparedness Inspector S. Janicki, Resident Inspector R. Kopriva, Senior Reactor Inspector J. Melfi, Project Engineer W. Sifre, Senior Reactor Inspector D. You, Operations Engineer
Approved By:	Gregory E. Werner, Chief Reactor Projects 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 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.

List of Findings and Violations

Failure to Establish Appropriate Specifications for Motor-Operated Valves			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000483/2021003-02 Open/Closed	[P.5] - Operating Experience	71152
The inspectors reviewed a self-revealing, Green finding and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to establish appropriate design specifications for motor-operated valves. Specifically, the licensee required motor-operated valves with torque-switch-controlled closures to have an additional 25 percent over-thrust applied beyond calculated minimums. This excessive force created a long-term failure mechanism in the valve's motor-operator. As a result, when cooling down the plant in a forced outage, the licensee was unable to place one of two trains of shutdown cooling in service due to suction valve EJHV8701B failing to operate.			

Failure to Monitor the Performance of the Service Water System in Maintenance Rule			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000483/2021003-03 Open/Closed	[H.8] - Procedure Adherence	71152
The inspectors identified a Green non-cited violation of 10 CFR 50.65(a)(1) for the licensee's failure to monitor the performance for the service water system to provide reasonable assurance that the service water system is capable of fulfilling its intended functions. The licensee failed to recognize that the service water system exceeded its maintenance rule reliability criteria and, as a result, the licensee did not perform the required maintenance rule evaluation and establish goals for the system. Specifically, the licensee failed to recognize that a February 9, 2021, loss of service water was the system's second maintenance preventable functional failure due to incorrectly evaluating a prior failure earlier in the monitoring period.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
URI	05000483/2021003-01	Failure to Maintain Siren Design as Described in the Alert and Notification System Report	71114.04	Open

PLANT STATUS

Callaway Plant began the inspection period shut down for an unplanned outage caused by a fault in the non-safety related main generator. On August 2, 2021, the licensee started up the reactor. On August 4, the licensee synchronized the main turbine generator with the electrical grid. On August 8, the licensee reached rated thermal power and operated at or near rated thermal power for the remainder 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 website 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 (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." 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.

Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), resident and regional inspectors were directed to begin telework and to remotely access licensee information using available technology. During this time, the resident inspectors performed periodic site visits each week, increasing the amount of time on-site as local COVID-19 conditions permitted. As part of their on-site activities, resident inspectors conducted plant status activities as described in IMC 2515, Appendix D, "Plant Status," and conducted routine reviews using IP 71152, "Problem Identification and Resolution," observed risk significant activities; and completed on-site portions of IPs. In addition, resident and regional baseline inspections were evaluated to determine if all or a portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on-site. The inspections documented below met the objectives and requirements for completion of the IP.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

Impending Severe Weather Sample (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated the adequacy of the overall preparations to protect risk-significant systems from impending severe weather on August 24, 2021.

External Flooding Sample (IP Section 03.03) (1 Sample)

(1) The inspectors evaluated that flood protection barriers, mitigation plans, procedures, and equipment were consistent with the licensee's design requirements and risk analysis assumptions for coping with external flooding on September 13, 2021.

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (3 Samples)

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

(1) Motor-driven auxiliary feedwater pump train B on July 12, 2021
(2) Emergency diesel generator train B on July 21, 2021
(3) Safety injection pump train A on July 27, 2021

Complete Walkdown Sample (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated system configurations during a complete walkdown of the turbine-driven auxiliary feedwater system on July 26, 2021.

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

(1) Fire pumphouse elevation 2000', fire area YD-1 on August 4, 2021
(2) Control building elevation 2016' access control and electrical equipment A/C units room, fire area C-13 on August 6, 2021
(3) Control building elevation 2073' upper cable spreading room, fire area C-22 on August 6, 2021
(4) Auxiliary building elevation 2000' and auxiliary feedwater pump rooms, fire areas A-1, A-13, A-14, A-15, A-29 and A-30 on August 6, 2021
(5) Turbine building elevation 2047', fire area TB-1, on August 12, 2021
(6) Control building elevation 1974' pipe space and tank area, fire area C-1 on August 28, 2021

Fire Brigade Drill Performance Sample (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated the onsite fire brigade training and performance during an unannounced fire drill on July 7, 2021.

71111.07A - Heat Sink Performance

Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

(1) Spent fuel pool heat exchanger train A on September 10, 2021

71111.07T - Heat Sink Performance

Heat Exchanger (Service Water Cooled) (IP Section 03.02) (3 Samples)

The inspectors evaluated heat exchanger/sink performance on the following:

(1) Electrical penetration room cooler SGL15A
(2) Motor-driven auxiliary feedwater pump room cooler SGF02A
(3) Emergency diesel generator coolers (intercooler, lube oil, jacket water) EKJ03B, EKJ04B, EKJ06B

Ultimate Heat Sink (IP Section 03.04) (1 Sample)

(1) Ultimate heat sink, Section 03.04, specifically Sections 03.04.b and 03.04.c were completed.

71111.11A - Licensed Operator Requalification Program and Licensed Operator Performance

Requalification Examination Results (IP Section 03.03) (1 Sample)

(1) The inspectors reviewed and evaluated the licensed operator examination failure rates for the requalification annual operating exam administered on September 7, 2021.

71111.11B - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Requalification Program (IP Section 03.04) (1 Sample)

(1) Biennial Requalification Written Examinations

The inspectors evaluated the quality of the licensed operator biennial requalification written examination administered on September 7, 2021.

Annual Requalification Operating Tests

The inspectors evaluated the adequacy of the facility licensee’s annual requalification operating test.

Administration of an Annual Requalification Operating Test

The inspectors evaluated the effectiveness of the facility licensee in administering requalification operating tests required by 10 CFR 55.59(a)(2) and that the facility licensee was effectively evaluating their licensed operators for mastery of training objectives.

Requalification Examination Security

The inspectors evaluated the ability of the facility licensee to safeguard examination material, such that the examination was not compromised.

Remedial Training and Re-examinations

The inspectors evaluated the effectiveness of remedial training conducted by the licensee and reviewed the adequacy of re-examinations for licensed operators who did not pass a required requalification examination.

Operator License Conditions

The inspectors evaluated the licensee's program for ensuring that licensed operators meet the conditions of their licenses.

Control Room Simulator

The inspectors evaluated the adequacy of the facility licensee's control room simulator in modeling the actual plant, and for meeting the requirements contained in 10 CFR 55.46.

Problem Identification and Resolution

The inspectors evaluated the licensee's ability to identify and resolve problems associated with licensed operator performance.

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

(1) The inspectors observed and evaluated licensed operator performance in the control room during:
- Reactor startup including the approach to criticality on August 2, 2021
- Synchronizing the main turbine generator to the electric grid on August 4, 2021

Licensed Operator Requalification Training/Examinations (IP Section 03.02) (1 Sample)

(1) The inspectors observed and evaluated reactor startup training in the simulator on July 23, 2021.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (2 Samples)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components (SSCs) remain capable of performing their intended function:

(1) Turbine-driven auxiliary feedwater system including unavailability hours during extended Mode 3 operation in a forced outage on August 16, 2021
(2) Main generator neutral ground overcurrent troubleshooting on August 16, 2021

Quality Control (IP Section 03.02) (1 Sample)

The inspectors evaluated the effectiveness of maintenance and quality control activities to ensure the following SSC remains capable of performing its intended function:

(1) Protection and safety system time response testing on September 13, 2021

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

(1) Planned elevated risk during switchyard relay maintenance and testing on July 29, 2021
(2) Planned elevated risk due to a reactor startup on August 2, 2021
(3) Planned elevated risk for turbine-driven auxiliary feedwater system maintenance on September 7, 2021

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (4 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

(1) Emergency core cooling systems flow element calculation under Condition Report 202103751 on July 6, 2021
(2) Fire protection system nuisance alarms under Condition Report 202103910 on August 3, 2021
(3) Essential service water (ESW) containment cooler bypass valve position indication under Condition Report 201900036 on August 31, 2021
(4) Essential service water differential pressure transmitter vent manifold leak under Condition Report 202104953 on September 8, 2021

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the following post-maintenance test activities to verify system operability and functionality:

(1) Component cooling water pump train A after a planned equipment outage on August 25, 2021
(2) Motor-driven auxiliary feedwater pump train A after a planned equipment outage on September 1, 2021
(3) Turbine-driven auxiliary feedwater system after a planned equipment outage on September 6, 2021
(4) Component cooling water train B after a planned equipment outage on September 9, 2021

(5) Steam generator A atmospheric steam dump pressure transmitter after a planned equipment outage on September 28, 2021

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated forced outage activities from July 1 through August 4, 2021

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (3 Samples)

(1) Emergency diesel generator train A monthly surveillance test on August 5, 2021
(2) Safety injection pump train A surveillance test on August 8, 2021
(3) Control rod repositioning and data collection on August 26, 2021

Inservice Testing (IP Section 03.01) (1 Sample)

(1) Essential service water pump train A inservice surveillance test on July 7, 2021

71114.01 - Exercise Evaluation

Inspection Review (IP Section 02.01-02.11) (1 Sample)

(1) The inspectors evaluated the biennial emergency plan exercise conducted on September 21, 2021. The exercise scenario simulated a rapidly escalating event starting with a significant seismic event resulting in the loss of all offsite and onsite AC power and loss of certain control room indications. The spent fuel pool cooling system eventually was lost and water leaking from the spent fuel pool was simulated due to a major aftershock, ultimately resulting in spent fuel pool water level reducing to a very low level for an extended period of time, declaration of a general emergency and issuance of a protective action recommendation to the offsite authorities. The exercise also included demonstration of one of the station's extensive damage mitigation guideline strategies, per the requirements of 10 CFR 50.155(b)(2), in mitigating the loss of the spent fuel pool water inventory.

71114.04 - Emergency Action Level and Emergency Plan Changes

Inspection Review (IP Section 02.01-02.03) (1 Sample)

(1) The inspectors evaluated the following recent Radiological Emergency Response Plan (RERP) and implementing procedure changes, using the 10 CFR 50.54(q) change process:

- 50.54(q) Screening and Evaluation 2020-030, for a change to the RERP related to the relocation of the Montgomery County EOC
- Administrative Changes to six risk significant, RERP-related emergency implementing procedures, changing the name/designation of the software used to complete offsite emergency notifications

- 50.54(q) Screening and Evaluation 2021-004, for changes to Procedure EIP-ZZ-00211, Field Monitoring, Revision 40

This evaluation does not constitute NRC approval of the changes.

71114.06 - Drill Evaluation

Select Emergency Preparedness Drills and/or Training for Observation (IP Section 03.01) (1 Sample)

(1) Full participation emergency drill with emergency response organization Team 5 on August 19, 2021

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

(1) Emergency preparedness drill including licensed operator continuing training, Session 21-4, on July 19, 2021

71114.08 - Exercise Evaluation Scenario Review

Inspection Review (IP Section 02.01 - 02.04) (1 Sample)

(1) The inspectors reviewed the licensee's preliminary exercise scenario that was submitted to the NRC on June 30, 2021, (ADAMS Accession Number ML21181A346) for the exercise scheduled to occur on September 21, 2021. The inspectors discussed the preliminary scenario with Mr. G. Rauch, Manager, Emergency Preparedness, and other members of the emergency preparedness staff on August 12, 2021. The inspectors' review does not constitute NRC approval of the scenario.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (1 Sample)

(1) July 1, 2020, through June 30, 2021

IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02) (1 Sample)

(1) July 1, 2020, through June 30, 2021

IE04: Unplanned Scrams with Complications (USwC) Sample (IP Section 02.03) (1 Sample)

(1) July 1, 2020, through June 30, 2021

EP01: Drill/Exercise Performance (DEP) Sample (IP Section 02.12) (1 Sample)

(1) July 1, 2020, through June 30, 2021

EP02: Emergency Response Organization (ERO) Drill Participation (IP Section 02.13) (1 Sample)

(1) July 1, 2020, through June 30, 2021

EP03: Alert and Notification System (ANS) Reliability Sample (IP Section 02.14) (1 Sample)

(1) July 1, 2020, through June 30, 2021

71152 - Problem Identification and Resolution

Annual Follow-up of Selected Issues (IP Section 02.03) (4 Samples)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

(1) Performance testing results of FLEX equipment, including pumps used for spent fuel pool cooling strategies, under Condition Reports 202104696 and 202104697 on August 18, 2021
(2) Effectiveness of corrective actions related to the full implementation cyber security program inspection findings as described in NRC Cyber Security Inspection Report 05000483/2019410 (ADAMS Accession Number ML19325C969)
(3) History of failures associated with shutdown cooling suction valves, under Condition Reports 201902392 and 202103140, on September 1, 2021
(4) Evaluation of service water (SW) system failures, including maintenance rule aspects, under Condition Report 202102519 on September 9, 2021

INSPECTION RESULTS

Unresolved Item (Open)	Failure to Maintain Siren Design as Described in the Alert and Notification System Report URI 05000483/2021003-01	71114.04

Description: The NRC identified a deviation between the height of the licensee's emergency response sirens and the design height as described in their Federal Emergency Management Agency (FEMA) approved Alert and Notification System Design Report.

The inspectors determined "Callaway Plant Alert and Notification System Design Report," dated January 2020, Section E.6.2.1, Tab 1, and Tab 6 indicate that the sirens are mounted on poles at approximately 50 feet above the ground. The licensee changed the height of 23 of their 29 sirens by replacing them with new poles at a height of 40 feet above the ground during the period December 2020 to January 2021. The licensee evaluated the proposed change for effects on the site emergency plan using the 10 CFR 50.54(q) process in September 2020. However, the licensee, working with the state and local response organizations, did not submit this proposed change to FEMA for review and approval using their regulatory processes. Having sirens installed differently than described in the applicable design document constitutes a deviation from the FEMA approved design report.

Planned Closure Actions: Alert and notification system design reports require FEMA approval, this deviation from the approved design report requires a review and determination from FEMA regarding its acceptability. This unresolved item will remain open pending determination of acceptability from FEMA. A determination on whether this deviation constitutes a performance deficiency will be made after FEMA's determination of acceptability.

Licensee Actions: The licensee recognizes the differences between the current siren installations and what is described in the design report identified in this inspection. As a result, the licensee is evaluating the differences and will coordinate with FEMA as needed to resolve the issue.

Corrective Action References: Condition Report 202105375.

Failure to Establish Appropriate Specifications for Motor-Operated Valves			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000483/2021003-02 Open/Closed	[P.5] - Operating Experience	71152

The inspectors reviewed a self-revealing, Green finding and associated non-cited violation of Title 10 of the Code of Federal Regulations (CFR) Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to establish appropriate design specifications for motor-operated valves. Specifically, the licensee required motor-operated valves with torque-switch-controlled closures to have an additional 25 percent over-thrust applied beyond calculated minimums. This excessive force created a long-term failure mechanism in the valve's motor-operator. As a result, when cooling down the plant in a forced outage, the licensee was unable to place one of two trains of shutdown cooling in service due to suction valve EJHV8701B failing to operate.

Description: The station's residual heat removal (RHR) system, consisting of two trains of components, provides reactor coolant system (RCS) cooling once plant pressures and temperatures are too low for steam generators to be an effective heat sink. Each train of RHR has two in-series suction isolation valves that are normally shut at power and are only opened when the RCS is below 425 psig and 350°F. Similarly, there are two in-series discharge isolation valves that are normally shut at power. The station's technical specifications describe the minimum set of operable components to maintain an effective RCS heat sink during the transition from at-power, Mode 1, to cold shutdown, Mode 5, where RHR is required. During this cooldown process, various systems such as reactor coolant pumps, steam generators, and RHR can be credited per each mode-specific set of technical specification requirements.

On June 2, 2021, the licensee was establishing conditions to cool down from Mode 4 to Mode 5 for repairs during their unplanned outage. When control room operators attempted to place train B of RHR into service, the circuit breaker for suction valve EJHV8701B tripped open and the control room lost indication for the valve. Equipment operators dispatched to the circuit breaker and to containment reported that the valve was still shut and the circuit breaker indicated a fault caused the trip. The licensee stopped the plant cooldown activities, remained in Mode 4, began troubleshooting, and generated Condition Report 202103140.

Valve EJHV8701B is a large motor-operated valve (MOV) with a Size 2 SMB operator and torque-switch-controlled closure. This means that the motor will only stop applying a closing force once the programmed torque value is reached. The valve position indication for EJHV8701B provides an indication for licensed operators in the control room but does not directly provide feedback to the MOV motor. When maintenance technicians inspected the MOV for EJHV8701B, the licensee determined that a spline gear associated with the motor-operator torque switch had several broken gear teeth. Further, evidence indicated that the motor had experienced a locked-rotor condition and required replacement. These results explained the observed failure of EJHV8071B to open but also implied the failure occurred earlier in the outage.

Since the torque switch was no longer coupled to the MOV operator due to the broken spline teeth, there was no feedback mechanism in place for the last time EJHV8701B was shut. As a result, the motor continuously applied force to a shut valve until the motor failed electrically during the last shutting operation. The licensee reviewed previous condition reports and plant data to determine that EJHV8701B was last shut and, therefore, had actually failed on May 24, 2021. On that day, the licensee lost indication of EJHV8701B after aligning the RHR system for a plant heat-up, wrote Condition Report 202102962, checked fuses and light bulb indications, and then reset the circuit breaker. Ultimately, it was determined that, from May 24 to June 2, 2021, the licensee had a latent condition of EJHV8701B being unable to open or shut remotely due to MOV actuator damage. The licensee ascended into Mode 4 only 3 hours after shutting EHJV8701B on May 24, 2021.

The licensee determined the cause of the component failure was an excessively large closing thrust applied to torque-switch-controlled closure MOVs (Condition Report 202103140). Specifically, when the MOV program was established approximately 25 years ago, the engineering evaluation documented adding 25 percent extra closing thrust on top of the thrust required to ensure the valves fully seat. This additional thrust applied excessive stresses to MOV actuator components and led to a long-term failure mechanism. When performing their extent of condition review, the licensee determined that the only affected valves (torque-switch-controlled closure MOVs) are the two shutdown cooling suction valves and two shutdown cooling discharge valves associated with RHR, valves EJHV8701A/B and BBPV8702A/B.

When the licensee reviewed previous MOV testing results for torque-switch-controlled closure MOVs, they found evidence to support that the thrust was excessive. Specifically, the excessive forces associated with operating these MOVs were captured on position traces over the past 10 years that showed rapid oscillation of the assembly against the spring pack when the valve broke free from the seat while opening. Said differently, the force involved with operating these MOVs was so high that the internal gears were rapidly loading and unloading against a spring-pack up to seven times per second instead of smoothly unseating. This high force applied to gear teeth, bouncing against each other multiple times per second, over the life of the MOV caused the spline gear for the torque switch to eventually fail. The licensee did not recognize this behavior on previous MOV traces as abnormal and did not investigate the cause at the time.

The inspectors independently reviewed the condition report and work history associated with EJHV8701B and noted that the licensee had evidence of spring-pack oscillations going back as early as 2007. More significantly, the licensee had a similar failure of EJHV8701A in April 2019 during a refueling outage. Captured in Condition Report 201902392, the licensee identified an unexplained increase of stem thrust when performing MOV testing on

EJHV8701A. Further investigation revealed that a torque switch gear was missing two teeth. At the time, the component was replaced and no additional cause or extent of condition review was completed. The inspectors also noted that licensee benchmarking performed in 2021 found most sites use a 5-10 percent added margin limit above minimum calculated thrust to ensure the valve seats fully without subjecting it to excessive forces.

The inspectors concluded that the licensee failed to establish appropriate specifications for MOVs. Specifically, the licensee required MOVs with torque-switch-controlled closures to have an excessive amount of over-thrust applied beyond calculated minimums that did not have an adequate technical basis and was not consistent with industry experience. This excessive force created a long-term failure mechanism in the valve's motor-operator that was detectable in MOV trace tests for years but was not recognized. For example, some tests found the over-thrust as high as 68 percent of the minimum torque required. Further, the licensee did not act on its own internal operating experience for a similar valve failure on the other train two years prior and did not investigate the cause when the breaker tripped at the time of the actual actuator failure in 2021.

Corrective Actions: The licensee stabilized the plant in Mode 4, performed a cause evaluation, inspected the MOV, replaced damaged components, performed an extent of condition review, and assigned corrective action to reduce the over-thrust requirement for related MOVs to licensee established design values.

Corrective Action References: Condition Report 202103140.

Performance Assessment:

Performance Deficiency: The failure to correctly translate the design of MOVs into specifications and procedures for the residual heat removal system was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, one train of RHR was unavailable for cooling, due to a latent failure, during a planned plant cooldown.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix G, "Shutdown Operations Significant Determination Process" dated March 1, 2020. The finding required further analysis under Attachment 1, "Phase 1 Initial Screening and Characterization of Findings," and Exhibit 3, "Mitigating Systems Screening Questions." The Senior Reactor Analyst (SRA) noted that there is an error in the Exhibit 3 questions which is under review for a proposed revision. Specifically, question 8 should state, "Does the finding involve issues related to fire brigade, fire hoses, fire extinguishers, or hose stations? If NO, then screen as Green, otherwise continue with part C below." With this information, the inspectors screened the significance of the finding and answered "no" to questions 1 through 8. As a result, the finding was determined to be of very low safety significance (Green).

Cross-Cutting Aspect: P.5 - Operating Experience: The organization systematically and effectively collects, evaluates, and implements relevant internal and external operating experience in a timely manner. The finding had a Problem Identification and Resolution

cross-cutting aspect associated with Operating Experience in that the licensee did not adequately evaluate the similar failure of MOV gear teeth in 2019 for RHR valve EJHV8701A.

Enforcement:

Violation: Title 10 of the Code of Federal Regulations Part 50, Appendix B, Criterion III, "Design Control," requires in part, that measures shall be established to assure that applicable regulatory requirements and the design basis, are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled.

Contrary to the above, from April 11, 2019, to June 2, 2021, the licensee failed to assure that applicable regulatory requirements and the design basis, were correctly translated into specifications, drawings, procedures, and instructions and that deviations from appropriate quality standards were controlled. Specifically, the licensee required MOVs with torque-switch-controlled closures to have an additional 25 percent over-thrust applied to the torque switch setpoint beyond calculated minimums without an adequate design basis for the over-thrust setting. When the torque switch was set at the high value, the resulting force created a long-term failure mechanism in the valve's motor-operator. As a result, when cooling down the plant in a forced outage, the licensee was unable to place one of two trains of shutdown cooling in service due the suction valve EJHV8701B failing to operate.

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

Failure to Monitor the Performance of the Service Water System in Maintenance Rule			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000483/2021003-03 Open/Closed	[H.8] - Procedure Adherence	71152

The inspectors identified a Green non-cited violation of Title 10 of the Code of Federal Regulations 50.65(a)(1) for the licensee's failure to monitor the performance for the service water system to provide reasonable assurance that the service water system is capable of fulfilling its intended functions. The licensee failed to recognize that the service water system exceeded its maintenance rule reliability criteria and, as a result, the licensee did not perform the required maintenance rule evaluation and establish goals for the system. Specifically, the licensee failed to recognize that a February 9, 2021, loss of service water was the system's second maintenance preventable functional failure due to incorrectly evaluating a prior failure earlier in the monitoring period.

Description: The service water systems consist of the non-safety (SW) system and a safety-related seismically-qualified essential service water (ESW) system. These systems can provide cooling flow for heat removal from plant equipment during normal and post-accident operations. The non-safety SW system also serves the additional function of providing cooling water to the safety-related ESW system during normal operation or when the ESW system is unavailable.

The maintenance rule program basis document, Procedure EDP-ZZ-01128, Revision 29, "Maintenance Rule Program," outlines the requirements and responsibilities for compliance with 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." Appendices to this procedure include Appendix 1, Revision 12,

"SSCs in the Scope of the Maintenance Rule at Callaway;" Appendix 2, Revision 36, "Summary of SSC Performance Criteria;" and Appendix 4, Revision 22, "Maintenance Rule System Functions." These procedures identify the applicable structures, systems, and components (SSCs) to which 10 CFR 50.65 applies, their performance criteria, the thresholds for meeting their performance criteria and requirements in the event the criteria are not met.

From July 22 through September 18, 2020, the licensee experienced multiple engineered safety features actuation systems panel alarms caused by a loose control power fuse in the feeder breaker to EFHV0024, one of the two motor-operated isolation valves in the SW to ESW cross-tie header. While cycling EFHV0024, system vibration would result in the fuse intermittently losing contact and causing momentary interruptions in control power. This fuse issue was previously dispositioned as a non-cited violation in Inspection Report 05000483/2021001 (ADAMS Accession Number ML21131A220).

On February 9, 2021, the licensee experienced a complete loss of SW while repairing a pipe leak in the system. The SW pumps tripped and locked out on low lube water pressure resulting from inadequate work instructions that caused the pumps to trip and lock out due to low lube water pressure. This issue was previously dispositioned as a licensee-identified minor violation in Inspection Report 05000483/2021002 (ADAMS Accession Number ML21216A312).

Maintenance rule evaluations were performed for each of these issues and approved by the licensee's maintenance rule expert panel. The loose control power fuse evaluation concluded the loose fuse would not have resulted in the loss of any maintenance rule function since a second MOV in the SW to ESW cross-tie header remained capable of closing to isolate the two systems, preserving system functions, and maintaining operability of the ESW system. The evaluation for the February 9, 2021, loss of SW concluded there was a loss of function for the SW system and that it was maintenance preventable.

The inspectors reviewed the licensee's maintenance rule evaluations for each issue and noted that the loose control power fuse evaluation failed to address all the functions described in Procedure EDP-ZZ-01128, Appendix 4, Revision 22, "Maintenance Rule System Functions." Specifically, the maintenance rule evaluation failed to address SW function EA-02, "Provides cooling water for heat removal from Safety Related equipment when ESW system is NOT in service." The inspectors concluded SW function EA-02 required both cross-connect valves to be open for SW to provide for heat removal for safety-related equipment; however, the interruption of control power caused by the loose fuse could not provide reasonable assurance that cross-connect valves would remain capable of opening during or after a postulated seismic event.

The licensee documented the inspectors concerns in Condition Report 202102519, "Feedback on Maintenance Rule Evaluation Needs Review," and reopened the maintenance rule evaluation. On August 31, 2021, the licensee's maintenance rule expert panel approved a revision to the original maintenance rule evaluation that classified the loose control power fuse as a maintenance preventable functional failure (MPFF) of EA-02. According to Procedure EDP-ZZ-001128, Appendix 2, Revision 36, "Summary of SSC Performance Criteria," the maintenance rule reliability criteria for the SW system is less than or equal to one MPFF per rolling 18-month period. The revised maintenance rule evaluation resulted in the licensee exceeding the SW system's performance threshold on February 9, 2021, when the second SW MPFF occurred.

The inspectors concluded that the licensee failed to recognize a February 9, 2021, loss of SW was the system's second MPFF due to incorrectly evaluating a prior failure earlier in the monitoring period. As a result, the licensee failed to recognize that the SW system exceeded its maintenance rule reliability criteria and did not perform the required maintenance rule evaluation and establish goals for the system.

Corrective Actions: The licensee entered the issue into the corrective action program, initiated a 10 CFR 50.65(a)(1) evaluation, and moved the SW system to 10 CFR 50.65(a)(1) status.

Corrective Action References: Condition Report 202102519.

Performance Assessment:

Performance Deficiency: The failure to monitor the performance for the SW system under the maintenance rule is a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the SW system exceeding its maintenance rule performance criteria which demonstrated that the system was not being effectively controlled through appropriate preventive maintenance.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The inspectors determined the finding was of very low safety significance (Green) because the finding did not (1) affect the design or qualification of a mitigating SSC, (2) represent a loss of the PRA function of a single train technical specification system for greater than its technical specification allowed outage time, (3) represent a loss of the PRA function of one train of a multi-train technical specification system for greater than its technical specification allowed outage time, (4) represent a loss of the PRA function of two separate technical specification systems for greater than 24 hours, (5) represent a loss of a PRA system and/or function as defined in the PRIB or the licensee's PRA (such as recovery of offsite power or the ability to feed and bleed) for greater than 24 hours, or (6) represent a loss of the PRA function of one or more non-technical specification trains of equipment designated as risk-significant in accordance with the licensee's maintenance rule program for greater than 3 days.

Cross-Cutting Aspect: H.8 - Procedure Adherence: Individuals follow processes, procedures, and work instructions. This finding had a human performance cross-cutting aspect, associated with Procedure Adherence because individuals failed to follow maintenance rule processes and procedures. Specifically, the maintenance rule basis document, Procedure EDP-ZZ-01128, directs the use of a "Functional Failure/MPFF/ Repetitive MPFF Determination Checklist," which provided guidance for performing Functional Failure Evaluations. This checklist was not followed in that the review of all functions for a given system or component, their performance criteria, and search of applicable internal/external operating experience did not identify the correct functions for the SW system.

Enforcement:

Violation: Title 10 CFR 50.65(a)(1), requires, in part, that the holders of an operating license shall monitor the performance or condition of structures, systems, or components (SSCs) within the scope of the rule as defined by 10 CFR 50.65(b), against licensee-established goals, in a manner sufficient to provide reasonable assurance that such SSCs are capable of fulfilling their intended functions.

Title 10 CFR 50.65(a)(2) states, in part, that monitoring as specified in 10 CFR 50.65(a)(1) is not required where it has been demonstrated that the performance or condition of an SSC is being effectively controlled through the performance of appropriate preventive maintenance, such that the SSC remains capable of performing its intended function.

Contrary to the above, from February 9 to August 31, 2021, the licensee failed to monitor the performance or condition of structures, systems, or components, against licensee-established goals, in a manner sufficient to provide reasonable assurance that these structures, systems, and components are capable of fulfilling their intended functions. When the performance did not meet established goals, appropriate action was not taken. Specifically, the licensee failed to correctly evaluate SW system failures which exceeded the performance criteria of maintenance preventable functional failures per rolling 18-month period. As a result, the licensee did not perform required maintenance rule evaluations and establish goals for the system.

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

EXIT MEETINGS AND DEBRIEFS

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

- On June 24, 2021, the inspectors presented the biennial requalification inspection results to Mr. F. Bianco, Senior Director Nuclear Operations and Plant Manager, and other members of the licensee staff.

- On August 19, 2021, the inspectors presented the cyber security problem identification and resolution corrective action verification inspection results to Mr. J. Pitts, Supervising Engineer, and other members of the licensee staff.

- On September 13, 2021, the inspectors presented the biennial requalification inspection results to Mr. T. Sanders, Exam Writer, and other members of the licensee staff.

- On September 16, 2021, the inspectors presented the triennial heat exchanger/sink performance inspection results to Mr. B. Cox, Site Vice President, and other members of the licensee staff.

- On October 6, 2021, the inspectors presented the integrated inspection results to Mr. F. Bianco, Senior Director Nuclear Operations and Plant Manager, and other members of the licensee staff.

- On October 21, 2021, the inspectors presented the emergency preparedness exercise inspection results to Mr. B. Cox, Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Corrective Action Documents	Condition Reports	201706767, 201805177, 201905291, 202101048, 202103102, 202103469, 202104413, 202105053, 202105276	
71111.01	Miscellaneous	M-018-0309	Diesel Generator Technical Manual	0
71111.01	Miscellaneous	M-07LF02	Plumbing and Drainage System	9
71111.01	Miscellaneous	RFR 170332	Approve Flat Diesel Building Roof Drain Cover	0
71111.01	Procedures	OTO-ZZ-00012	Severe Weather	44
71111.01	Procedures	OTS-ZZ-00007	Plant Cold Weather	40
71111.04	Corrective Action Documents	Condition Reports	202006843, 202007114, 202100228, 202102821, 202103266, 202104096, 202104209, 202104574, 202105181, 202005835	
71111.04	Procedures	OSP-AL-00001	AFW Flow Paths Valve Alignment	10
71111.04	Procedures	OSP-AL-0002A	TDAFW to Steam Generators Flow Path Verification	3
71111.04	Procedures	OSP-NE-00002	Simultaneous Start of Both Diesel Generators	21
71111.04	Procedures	OTN-AL-00001	Auxiliary Feedwater System	38
71111.05	Corrective Action Documents	Condition Reports	202100031, 202100038, 202101776, 202103776, 202103787, 202103832, 202104877, 202105235	
71111.05	Miscellaneous		Unannounced Fire Drill Plan 21-1	07/05/2021
71111.05	Procedures		Fire Preplan Manual	40
71111.07T	Calculations	EF-123	UHS Thermal Performance Analysis using GOTHIC	2
71111.07T	Calculations	EF-32, Calculation Cover Page	Minimum ESW Flow to the Diesel Generator Lube Oil Coolers	0
71111.07T	Calculations	EF-45	Acceptance Criteria Used in Essential Service Water Flow Balance Procedures	8
71111.07T	Calculations	GL-05	Determine Resonant Frequency of M-612 Room Cooler Coil Tubes	0
71111.07T	Calculations	GL-06	Area Room Cooler Maximum Allowed Differential Pressure	0
71111.07T	Calculations	KJ-19	Minimum Wall Thickness Calculation for EKJ03A/B Tubing	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.07T	Calculations	KJ-20	Evaluate Tube Plugging Limits for EDG Intercooler Heat Exchangers, EKJ03A/B, EDG Jacket Water Heat Exchangers, EKJ06A/B, and EDG Lube Oil Coolers, KJ04A/B	0
71111.07T	Calculations	M-EF-20	Essential Service Water System DP Normal Operation	0
71111.07T	Calculations	M-EF-52, Addendum 3	Heat Exchanger Performance Based on Reduced ESW Temperatures and Flows for Replaced Cooling Coils	0
71111.07T	Calculations	M-GF-01	Room 1325 and 1326	0
71111.07T	Calculations	TM-2525	Weight, Seismic, Support Calculations for J-2684A/B Emergency Diesel Engine Intercooler Heat Exchangers, Equipment No: EKJ03A/B	1
71111.07T	Corrective Action Documents	Condition Reports	201505499, 201905148, 202002628, 202001374, 202004386, 201105897, 201901190, 201905148, 201905572, 202105215, 202105234, 202105240	
71111.07T	Drawings	C-U101 (Q) (UNO)	Ultimate Heat Sink Retention Pond - Plan and Sections	11
71111.07T	Drawings	C-U102 (Q) (UNO)	Ultimate Heat Sink Discharge and Outlet Structures - Plans and Sections	8
71111.07T	Drawings	C-UC303 (Q) (UNC)	E.S.W.S. Pumphouse Conc. Neat Line & Reinforcing Plan at El 2025’-0” & Sections	14
71111.07T	Drawings	M-018-00028	Colt Industries General Arrangement 14 Cyl.	16
71111.07T	Drawings	M-1055-00212	Heat Exchanger Tube Tracking Drawing Diesel Generator B Intercooler Heat Exchanger EKJ03B	4
71111.07T	Drawings	M-1055-00222	Auxiliary Feedwater Pump Room Cooler “A” SGF02A	3
71111.07T	Drawings	M-1055-00240	Auxiliary Building Penetration Room Cooler “A” SGL15A	3
71111.07T	Drawings	M-2018-00001	Emergency Diesel Generation Intercooler Heat Exchangers Outline/Assembly	1
71111.07T	Drawings	M-22EF01 (Q)	Piping and Instrumentation Diagram Essential Service Water System (FSAR Figure 9.2-2 Sheet 1)	83
71111.07T	Drawings	M-22EF02 (Q)	Piping and Instrumentation Diagram Essential Service Water System (FSAR Figure 9.2-2 Sheet 2)	78
71111.07T	Drawings	M-22EF03	Piping and Instrumentation Diagram Essential Service Water System	8
71111.07T	Drawings	M-22GL01(Q)	Auxiliary Building HVAC	34

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.07T	Drawings	M-22KJ01 (Q)	Piping and Instrumentation Diagram Standby Diesel Generator “A” Cooling Water System	24
71111.07T	Drawings	M-22KJ03 (Q)	Piping and Instrumentation Diagram Standby Diesel Generator “A” Lube Oil System	20
71111.07T	Drawings	M-22KJ04 (Q), Sheet 2	Piping and Instrumentation Diagram Standby Diesel Generator “B” Cooling Water System	24
71111.07T	Drawings	M-22KJ06 (Q), Sheet 2	Piping and Instrumentation Diagram Standby Diesel Generator “B” Lube Oil System	20
71111.07T	Drawings	M-U2EF01 (Q)	Piping & Instrumentation Diagram Essential Service Water System (FSAR Figure 9.2-2 Sheet 3)	72
71111.07T	Drawings	M-UG081	Essential Service Water System Pump House Equipment Locations - Sections	5
71111.07T	Engineering Changes	MP 19-0113	Design Equivalent Change Package - ESW Water Hammer Mitigation Phase 2	1
71111.07T	Engineering Changes	MP 20-0006	Design Equivalent Change Package - UHS Cooling Tower Fan Motor Circuits Relay Replacement	0
71111.07T	Engineering Evaluations	RFR 7809	Room Cooler Operability Envelope	E
71111.07T	Engineering Evaluations	RFR 7809	Room Cooler Performance Envelope for Operability	C
71111.07T	Miscellaneous		EAC Supersystem Health Report- Performance Monitoring Graded Report	08/19/2021
71111.07T	Miscellaneous	17510187.500 Addendum	Flush ESW Supply Piping to KCHR0140. ESW Fire Water Flush Instructions	
71111.07T	Miscellaneous	19507121.500 Addendum	Instructions for “B” Train Fire Hose Flush	0
71111.07T	Miscellaneous	2015013	Risk of SGF01 Failure and Impact on Auxiliary Feedwater Train Operability (PH)	05/10/2018
71111.07T	Miscellaneous	Health Report	GL – Auxiliary Building HVAC	05/14/2021
71111.07T	Miscellaneous	Health Report	GF – Miscellaneous Building HVAC	08/23/2021
71111.07T	Miscellaneous	Heat Exchanger Inspection Report	“B” EDG Jacket Water HX	09/17/2019
71111.07T	Miscellaneous	Heat Exchanger Inspection Report	Auxiliary Building North Electrical Penetration Room Cooler	10/29/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.07T	Miscellaneous	Heat Exchanger Inspection Report	A MDAFW Pump Room Cooler	03/10/2020
71111.07T	Miscellaneous	J-2684-A/B, Report No: TM-2623	Joseph Oat Corporation Heat Exchanger Data Sheets and Tube Vibration Report for Emergency Diesel Generator Intercooler Heat Exchangers EKJ03A, EKJ03B, for Ameren UE Callaway Nuclear Plant - Unit 1	0
71111.07T	Miscellaneous	M-1089(Q)	Technical Specification for Replacement Room Cooler Coils	3
71111.07T	Miscellaneous	M-1089-00100	Design Report ASME Boiler & Pressure Vessel Code Aerofin Type R Coils	1
71111.07T	Miscellaneous	M-1195-00008	Lube Oil Cooler, Specification Sheet, CA-#1733, 09-12-94, EDP-ZZ-04021	0
71111.07T	Miscellaneous	M-1196-00008	Jacket Water Heat Exchanger Specification Sheet	0
71111.07T	Miscellaneous	M-612-00062	Carrier Corp. Installation, Operating & Maintenance Instructions for Air Handling Units (Room Coolers) for SNUPPS	23
71111.07T	Miscellaneous	RFR 190147	Approve Replacement Relays for the Obsolete ITE Gould 2190E Relays Utilized in the UHS Cooling Tower	0
71111.07T	Miscellaneous	Specification No. 10466-E-091.0 (Q), Job No. 10466	Technical Specification for Seismic Qualification of Class 1E Equipment for the Standardized Nuclear Unit Power Plant System (SNUPPS)	06/07/1976
71111.07T	Miscellaneous	Specification No. 10466-M-900 (Q), Job No. 10466	Technical Specification for Qualification of Seismic Category I Mechanical Systems and Equipment for the Standardized Nuclear Unit Power Plant System (SNUPPS)	07/09/1975
71111.07T	Miscellaneous	Specification No. M-1195	Design Specification No. M-1195(Q) for Replacement Emergency Diesel Engine Lube Oil Cooler Heat Exchangers EKJO4A, EKJO4B	2
71111.07T	Miscellaneous	Specification No. M-1196	Design Specification No. M-1196(Q) for Replacement Emergency Diesel Engine Jacket Water Heat Exchangers EKJO6A, EKJO6B	2
71111.07T	Miscellaneous	Specification No. M-2018	Design Specification No. M-2018 (Q) for Replacement Emergency Diesel Engine Intercooler Heat Exchangers EKJ03A, EKJ03B	1

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.07T	Miscellaneous	ULNRC-2146	Response to Generic Letter 89-13 Service Water System Problems Affecting Safety-Related Equipment	01/29/1990
71111.07T	NDE Reports	Anatec Project: ASC-14, Plant Work Order: 09511826/500	Final Eddy Current Inspection Report for: Emergency Diesel Generator B Lube Oil Cooler EKJ04B	04/08/2014
71111.07T	NDE Reports	Anatec Project: ASC-18, Plant Work Order: 09511827-500	Final Eddy Current Inspection Report for: Emergency Diesel Generator B Jacket Water Cooler	04/07/2015
71111.07T	NDE Reports	Anatec Project: ASC-37, Plant Work Order: 09511907-500	Final Eddy Current Inspection Report for: EDG B - Intercooler (EKJ03B)	03/02/2021
71111.07T	Procedures	APA-ZZ-00549, Appendix B	Guidelines Used to Determine Functional Importance for a Component	13
71111.07T	Procedures	APA-ZZ-01025	Raw Water Systems Control Program	6
71111.07T	Procedures	APA-ZZ-01025, Appendix A	Raw Water Chemistry Strategic Optimization Plan	3
71111.07T	Procedures	EDP-ZZ-00018	Heat Exchanger Eddy Current Testing Methodology	3
71111.07T	Procedures	EDP-ZZ-01112	Heat Exchanger Predictive Performance Manual	25
71111.07T	Procedures	EOP Addendum 17	Securing ESW Train Due to UHS Cooling Tower Trouble	3
71111.07T	Procedures	ETP-ZZ-03001	GL89-13 Heat Exchanger Inspection	14
71111.07T	Procedures	OOA-EF-00001	Ultimate Heat Sink Setpoint Levels	13
71111.07T	Procedures	OSP-EF-0002A	Essential Service Water Train A Flow Verification	15
71111.07T	Procedures	OSP-EF-0002B	Essential Service Water Train B Flow Verification	15
71111.07T	Procedures	OSP-EF-0003B	Train B UHS Cooling Tower Fans Test	9
71111.07T	Procedures	OTA-RK-00014, Addendum 12A	Service Water Pump Lockout	9
71111.07T	Procedures	OTA-RK-00014, Addendum 12C	Service Water Lube Water Pressure Low	0
71111.07T	Procedures	OTA-RK-00014, Addendum 12D	Service Water Pump Trouble	1

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.07T	Procedures	OTA-RK-00014, Addendum 12E	Service Water Valve Trouble	0
71111.07T	Procedures	OTA-RK-00020, Addendum 54A	ESW A Pressure Low / Flow Low	3
71111.07T	Procedures	OTA-RK-00020, Addendum 54E	UHS Cooling Tower Trouble	10
71111.07T	Procedures	OTA-RK-00020, Addendum 55A	ESW B Pressure Low / Flow Low	3
71111.07T	Procedures	OTA-RK-00020, Addendum 55C	ESW Strainer Differential Pressure High	1
71111.07T	Self-Assessments	SSA 201900029-045	GL 89-13 Programs (Items II and III)	03/27/2019
71111.07T	Work Orders	Job	P729530, 112501823, 7513334, 17506064, 18501842/500, 18503927, 18511321, 15511359, 18511140/500, 17502745, 19506833, 19513332/500, 21503905/500, 21505750	
71111.11B	Corrective Action Documents	Condition Reports	201901864, 201901923, 201903787, 201904906, 202001556, 202004518, 202100447, 202000212, 202103592, 202102654	
71111.11B	Miscellaneous		Cycle 21-4 LO Biennial Requalification Exam Week 1 SRO	07/19/2021
71111.11B	Miscellaneous		Cycle 21-4 LO Biennial Requalification Exam Week 1 RO	07/19/2021
71111.11B	Miscellaneous		Simulator Discrepancy Report Summary	04/11/2021
71111.11B	Miscellaneous		T14 Log Comp Cycle 23 1901	04/11/2021
71111.11B	Miscellaneous		Cycle 21-4 LO Biennial Requalification Exam Week 4 SRO	08/09/2021
71111.11B	Miscellaneous		Cycle 21-4 LO Biennial Requalification Exam Week 4 RO	08/09/2021
71111.11B	Miscellaneous		Cycle 23 Transients 1901	
71111.11B	Miscellaneous		Simulator Expert Review Group Minutes	07/16/2019
71111.11B	Miscellaneous		2021 Annual Exam Weeks 1-5	
71111.11B	Miscellaneous		2020 Annual Operating Exam (JPMs and Scenarios) Weeks 1-6	
71111.11B	Miscellaneous	Simulator Information Formal Tracking	2019034, 20190044, 20190062, 20200041, 20210030, 21002381	
71111.11B	Procedures	APA-ZZ-00500	Corrective Action Program Administrative Correction	74
71111.11B	Procedures	APA-ZZ-00912	Callaway Energy Center Medical Certification Program	21

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.11B	Procedures	CTM-OPS	Operations Training Programs	68
71111.11B	Procedures	CTM-SAT	Systematic Approach to Training	69
71111.11B	Procedures	EDP-ZZ-01129	Callaway Energy Center Risk Assessment	52
71111.11B	Procedures	PDP-ZZ-00023, App A	Priority Screening Matrix	6
71111.11B	Procedures	TDP-IS-00001	Simulator Operation and Maintenance	17
71111.11B	Procedures	TDP-IS-00002	Simulator Configuration Management	36
71111.11B	Procedures	TDP-ZZ-00019	Appendix A, Simulator Security Guidelines	47
71111.11B	Procedures	TDP-ZZ-00019	NRC License Examination Security and Integrity	23
71111.11B	Self-Assessments	20210323	Licensed Operator Continuing Training Program Self Assessment	04/22/2021
71111.11B	Self-Assessments	Audit Report AP19006	Nuclear Oversight Audit of Training	
71111.11Q	Corrective Action Documents	Condition Reports	201903832	
71111.11Q	Miscellaneous	T71.JITT S	Just in Time Training: F073 Turbine Generator Roll and Synchronization	07/22/2021
71111.11Q	Procedures	OTG-ZZ-00001	Plant Heatup Cold Shutdown to Hot Standby	95
71111.11Q	Procedures	OTG-ZZ-00001A	Shutdown Bank Withdrawal	21
71111.11Q	Procedures	OTG-ZZ-00002	Reactor Startup - IPTE	64
71111.11Q	Procedures	OTG-ZZ-00003	Plant Startup Hot Zero Power to 30% Power - IPTE	64
71111.11Q	Procedures	OTG-ZZ-00004	Power Operation	100
71111.12	Corrective Action Documents	Condition Reports	202104209	
71111.13	Miscellaneous		Shutdown Safety Management Plan	5
71111.15	Corrective Action Documents	Condition Reports	201803710, 201900036, 202103751, 202104953	
71111.19	Work Orders		205003409, 19510059, 20506090, 21505823	
71111.20	Procedures		Shutdown Safety Management Plan	5
71111.20	Procedures	OSP-AC-00004	Main Turbine Trip Tests	37
71111.20	Procedures	OTG-ZZ-00002	Reactor Startup - TPTE	64
71111.22	Procedures	OSP-EF-P001A	ESW Train A Inservice Test	85
71111.22	Procedures	OSP-EM-P0001A	Safety Injection Train A Inservice Test	54

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.22	Procedures	OSP-NE-0001A	Standby Diesel Generator A Periodic Tests	67
71111.22	Procedures	OSP-NE-0001A	Standby Diesel Generator A Periodic Tests	67
71111.22	Work Orders		21503905, 21504549	
71114.01	Corrective Action Documents	Condition Reports	201905442, 201905503, 201905507, 201905849, 201906158, 201906318, 201906320, 202003776, 202004103, 202004520, 202101289, 202103790, 202104756, 202105341, 202105820, 202105851	
71114.01	Miscellaneous		Callaway RERP NRC Graded Exercise (September 21, 2021) - Management Critique Presentation	09/30/2021
71114.01	Miscellaneous		Biennial Exercise Participant Logs from the EOF, TSC, OSA, JIC, and Control Room Simulator	09/21/2021
71114.01	Miscellaneous	RERP	Callaway Radiological Emergency Response Plan	52
71114.01	Miscellaneous	RERP	Callaway Radiological Emergency Response Plan (original revision reviewed and approved by the NRC in 1981)	3
71114.01	Procedures		Emergency Coordinator Supplemental Guide, Att. PP - Leakage Control Material	24
71114.01	Procedures		Emergency Coordinator Supplemental Guide, Att. JJ - Filling Spent Fuel Pool Using Mutual Aid Drafting	24
71114.01	Procedures	EIP-ZZ-00101	Classification of Emergencies	55
71114.01	Procedures	EIP-ZZ-00200	Augmentation of the Emergency Response Organization	21
71114.01	Procedures	EIP-ZZ-00201	Notifications	52
71114.01	Procedures	EIP-ZZ-00201, Addendum C	EOF Notification Package	35
71114.01	Procedures	EIP-ZZ-00212	Protective Action Recommendations	31
71114.01	Procedures	EIP-ZZ-00220	Emergency Team Formation	26
71114.01	Procedures	EIP-ZZ-00230	Accountability	35
71114.01	Procedures	EIP-ZZ-00240	Technical Support Center Operations (including Responder Checklist Addenda A-J)	44
71114.01	Procedures	EIP-ZZ-00260	Event Closeout/Plant Recovery	29
71114.01	Procedures	EIP-ZZ-01211	Accident Dose Assessment	41
71114.01	Procedures	EIP-ZZ-A0001	Emergency Response Organization	21
71114.01	Procedures	KDP-ZZ-02001	Drill and Exercise Program	28
71114.01	Procedures	KOA-ZZ-00125	Loss of Site A/C Power	5

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71114.01	Procedures	KOA-ZZ-00131	Spent Fuel Pool Time to 200 Degrees Fahrenheit	4
71114.01	Procedures	KOA-ZZ-04000	Completing the Offsite Notification Form (EIP-ZZ-00201)	2
71114.01	Procedures	KSP-ZZ-00004	Emergency Response Facilities	9
71114.01	Procedures	OTN-UB-70002	Technical Support Center Diesel Generator	14
71114.01	Procedures	OTN-UB-70003	TSC Diesel Generator Emergency Start	1
71114.01	Procedures	OTO-EC-00001	Loss of SFP/Refuel Pool Level	19
71114.04	Corrective Action Documents	Condition Reports	202105274, 202105382	
71114.04	Miscellaneous		Procedure Review Form - EIP-ZZ-00101, Addendum 1, Emergency Action Level Classification Matrix, Rev. 11	05/04/2021
71114.04	Miscellaneous		Procedure Review Form - EIP-ZZ-00102, Emergency Implementing Actions, Rev. 67	05/04/2021
71114.04	Miscellaneous		Procedure Review Form - EIP-ZZ-00201, Notifications, Rev. 52	05/04/2021
71114.04	Miscellaneous		Procedure Review Form - EIP-ZZ-00101, Protective Action Recommendations, Rev. 31	05/04/2021
71114.04	Miscellaneous		Procedure Review Form - EIP-ZZ-01211, Accident Dose Assessment, Rev. 41	05/04/2021
71114.04	Miscellaneous		Procedure Review Form - EIP-ZZ-00101, Addendum 2, Emergency Action Level Technical Bases Document, Rev. 18	05/04/2021
71114.04	Miscellaneous	EP Tracking No. 2020020	CR 202004189, Siren Pole Replacement Project	09/01/2020
71114.04	Miscellaneous	EP Tracking No. 2020030	Montgomery County EOC Move (for RERP, Rev. 053, Radiological Emergency Response Plan)	10/31/2020
71114.04	Miscellaneous	EP Tracking No. 2021004	EIP-ZZ-00211, Field Monitoring Team, Rev. 40	05/04/2021
71114.04	Procedures	APA-ZZ-00200	Document Control	32
71114.04	Procedures	KDP-ZZ-00400	RERP Impact Evaluations and Changes	27
71114.06	Corrective Action Documents	Condition Reports	202103411, 202104825	
71114.06	Miscellaneous		LOCT 21-4 DEP Guide	07/19/2021
71114.06	Miscellaneous		Emergency Response Organization Drill Guide	08/19/2021

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71114.08	Miscellaneous	ULNRC-06676	Docket Number 50-483, Callaway Plant Unit 1, Union Electric Co., Renewed Facility Operating License NPF-30; 2021 Callaway RERP Exercise	6/30/2021
71151	Corrective Action Documents	Condition Reports	202006918, 202007204, 202007206, 202100791, 202101226, 202105375, 202105380, 202105381, 202105385	
71151	Miscellaneous		Select Records of DEP PI Opportunity Assessments from LORT Sessions and ERO Drills	3Q/2020 - 2Q/2021
71151	Miscellaneous		Quarterly Callaway ERO Participation Records & ERO Rosters	3Q/2020 - 2Q/2021
71151	Miscellaneous		Select Records of Weekly and Monthly Tests of the Alert & Notification System Sirens	3Q/2020 - 2Q/2021
71151	Miscellaneous		Callaway Plant Alert and Notification System Design Report	01/01/2020
71151	Miscellaneous		NRC Performance Indicator Reports	
71151	Procedures	KDP-ZZ-02000	NRC Performance Indicator (PI) Data Collection	20
71151	Procedures	KSP-ZZ-00110	Siren Alert System Testing	17
71152	Corrective Action Documents	Condition Report	201906506, 201906564	
71152	Drawings	J-113G-00515	Centralized Logging System Functional Block Diagram	4
71152	Drawings	J-113G-00516	Network Intrusion Detection System Functional Block Diagram	3
71152	Miscellaneous		Cyber Security Group Organizational Chart and Contact List	
71152	Miscellaneous		Callaway Plant Unit 1 Cyber Security Plan	2
71152	Procedures	APA-ZZ-01108	Cyber Security Program	8
71152	Procedures	DTI-CS-018	Non-Engineering Configuration Control CDA Change Process	1
71152	Procedures	EDP-ZZ-01108	Cyber Security Program Implementation	10
71152	Procedures	EDP-ZZ-01108, Addendum 2	Security Control Implementation Strategy	7
71152	Procedures	EDP-ZZ-01108, Addendum 3	Callaway Ongoing Monitoring for Critical Digital Assets	9
71152	Procedures	EDP-ZZ-01108, Addendum 4	Cyber Security Threat and Vulnerability Notification Assessment Process	3

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71152	Procedures	EDP-ZZ-01108, Addendum 8	Centralized Cyber Security Monitoring System	4
71152	Procedures	EDP-ZZ-01108, Appendix A	Cyber Security Defensive Strategy	6
71152	Work Orders		19004695, 19004736, 19004999, 19005182, 19005183, 19005184, 19005186, 19005187, 19005188, 19005189, 19005190, 19005191, 19005192, 19500825, 19500827	