



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

August 5, 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 05000483/2021002 AND INDEPENDENT SPENT FUEL STORAGE
INSTALLATION INSPECTION REPORT 07201045/2021001

Dear Mr. Diya:

On June 30, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Callaway Plant. On July 7, 2021, the NRC inspectors discussed the results of this inspection with Mr. B. Cox, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation 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 the Callaway Plant.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the 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,

Neil F. O'Keefe, Chief
Reactor Projects Branch
Division of Reactor Projects

Docket No. 05000483 and 07201045
License No. NPF-30

Enclosure:
As stated

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CALLAWAY PLANT – INTEGRATED INSPECTION REPORT 05000483/2021002 AND
 INDEPENDENT SPENT FUEL STORAGE INSTALLATION INSPECTION REPORT
 07201045/2021001 – DATED AUGUST 5, 2021

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Number: 05000483 and 07201045

License Number: NPF-30

Report Number: 05000483/2021002 and 07201045/2021001

Enterprise Identifier: I-2021-002-0045 and I-2021-001-0170

Licensee: Ameren Missouri

Facility: Callaway Plant

Location: Steedman, MO

Inspection Dates: April 1 to June 30, 2021

Inspectors: D. Bradley, Senior Resident Inspector
J. Braisted, Reactor Inspector
L. Brookhart, Senior Spent Fuel Storage Inspector
S. Janicki, Resident Inspector
R. Kopriva, Senior Reactor Inspector
J. Melfi, Project Engineer
C. Smith, Health Physicist
F. Thomas, Reactor Inspector

Approved By: Neil F. O'Keefe, Chief
Reactor Projects Branch B
Division of Reactor Projects

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

Reactor Trip Due to Design and Maintenance Failures Associated with the Main Generator			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000483/2021002-01 Open/Closed	[H.14] - Conservative Bias	71153
<p>The inspectors reviewed a self-revealing, Green finding and associated a non-cited violation of Technical Specification 5.4.1.a, “Procedures,” for the licensee’s failure to properly pre-plan and perform maintenance on the main generator that affected safety-related components. Specifically, the scope of planned work changed significantly as new problems were discovered, errors occurred, and planning inadequacies became apparent. The licensee did not implement appropriate risk mitigating actions such as providing additional vendor oversight or obtaining third party expertise. As a result, the main generator experienced an electrical fault at 90 percent power, the reactor tripped, and safety-systems responded to stabilize the plant in Mode 3.</p>			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000483/2020-001-01	Emergency Exhaust Train Inoperable Due to Fan Belt Degradation and Failure	71153	Closed
LER	05000483/2020-002-01	Reactor Trip and Auxiliary Feedwater Actuation Following Spurious Main Feedwater Regulating Valve Closure	71153	Closed
LER	05000483/2020-007-00	“B” Pressurizer Power-Operated Relief Valve Inoperable Due to Nonconformance with Environmental Qualification Requirements	71153	Closed
LER	05000483/2020-008-00	Reactor Trip due to Main Generator Electrical Fault	71153	Closed
LER	05000483/2021-001-00	Manual Actuation of Essential Service Water System	71153	Closed

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 and remained shut down 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 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 onsite activities, resident inspectors conducted plant status activities as described in IMC 2515, Appendix D; 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

Seasonal Extreme Weather Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of seasonal warm temperatures and summer readiness for the following systems on June 22, 2021:
 - main switchyard and offsite power
 - vital DC power
 - essential service water
 - emergency diesel generators

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (4 Samples)

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

- (1) Train A protected train walkdown during planned train B emergency diesel generator and essential service water maintenance on April 14, 2021
- (2) Train A class 1E electrical equipment air conditioning unit SGK05A on May 3, 2021
- (3) Train B safety injection system following scheduled maintenance on May 18, 2021
- (4) Technical support center diesel generator and ventilation following scheduled maintenance on June 16, 2021

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (4 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) Control building 1974' pipe space, fire area C-1 on April 8, 2021
- (2) Auxiliary building 1974' elevation including train A centrifugal charging pump room and train A boric acid storage tank, fire areas A-3, A-4, and A-6 on May 4, 2021
- (3) Control building cable chases on various elevations and the lower cable spreading room, fire areas C-11, C-12, C-17, C-19, C-21, C-23, C-25, C-26, C-33, C-34, C-36, and C-37 on May 14, 2021
- (4) Main control room boards and panels, fire area C-27 on May 28, 2021

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 03.01) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the:

- (1) Auxiliary building 1974' elevation, ultimate heat sink cooling tower, and essential service water pumphouse including flood doors on April 20, 2021

Cable Degradation (IP Section 03.02) (1 Sample)

- (1) Switchyard cable trenches and site manholes on May 13, 2021

71111.11Q - Licensed Operator Regualification 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 plant heat-up in Mode 3 and surveillance testing on June 12, 2021

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

- (1) The inspectors observed and evaluated licensed operator training in the simulator including mode ascension, plant heat-up, and off-normal procedure response on June 4, 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 remain capable of performing their intended function:

- (1) Control of temporary alterations to support maintenance during planned non-safety service water lube water maintenance on May 3, 2021
- (2) Essential service water supply valves to auxiliary feedwater, including associated valves used in emergency procedures on May 6, 2021

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (4 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) Elevated risk during scheduled 125 VDC battery maintenance on April 5, 2021
- (2) Elevated risk during work on train A components including essential service water, emergency diesel generator, and engineered safety feature transformer on April 12, planned 2021
- (3) Elevated risk during scheduled fire protection system flow testing on April 27, 2021
- (4) Elevated risk during scheduled partial offsite power line outage and system restoration on June 15, 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) Ultimate heat sink cooling fan inspection results on April 14, 2021
- (2) Essential service water valve handwheel inspection results on April 19, 2021
- (3) Permanent scaffold in contact with residual heat removal piping on April 19, 2021
- (4) Main steam isolation valve stroke timing on May 20, 2021

71111.17T - Evaluations of Changes, Tests, and Experiments

Sample Selection (IP Section 02.01) (30 Samples)

The inspectors reviewed the following evaluations, screenings, and/or applicability determinations for 10 CFR 50.59 from June 21-25, 2021.

- (1) Corrective action (CA) CA2510/condition report (CR) 202001155, License Document Change Request (LDCR) for Tables 6.2.2-3 and 16.3-2 as described in Condition Report 201903261 and its corresponding actions
- (2) CA2510/CTP-ZZ-02590/053, primary to secondary leak rate determination

- (3) CA2510/ESP-ZZ-01016/009, ASME Section XI IWE containment pressure boundary inspection
- (4) CA2510/MSM-ZZ-QV006/000, generic inspection of swing check valves
- (5) CA2510/OSP-BB-LL022/012, containment isolation valve leak rate test
- (6) CA2510/OSP-EF-V001A/051, essential service water train A valve operability
- (7) CA2511/E-0, reactor trip or safety injection
- (8) CA2511/OTN-AL-00001, auxiliary feedwater system
- (9) CA2511/OTN-GK-00001, control building HVAC system
- (10) CA2511/LDCN 20-0026, LDCR for Tables 6.2.2-3 and 16.3-2 as described in Condition Report 201903261 and its corresponding actions
- (11) CA2512/20-02, Cycle 25 core reload design modification package for core reload and reactor coolant system heat-up
- (12) CA2512/20-05, use of Tornado Missile Risk Evaluator (TMRE) methodology to resolve tornado missile protection nonconformances
- (13) CA2512/20-06, Modification Package (MP) 19-0007, inboard/outboard mechanical seal orifice re-design for auxiliary feedwater pumps (Use of AutoPIPE)
- (14) 2018-07-13, aligning essential service water to auxiliary feedwater suction
- (15) 2019-02-14, essential service water train A inservice test
- (16) 2018-06-01, train A emergency diesel generator fuel oil system inservice tests
- (17) 2019-03-25, essential service water system water hammer mitigation modification
- (18) 2019-03-26, contingency modification for reactor pressure vessel stuck stud removal
- (19) 2020-02-18, essential service water system water hammer mitigation Phase 2
- (20) 13-01, Revision 1, main feedwater control system
- (21) 17-01, essential service water system water hammer mitigation modification
- (22) 19-02, hot leg recirculation valve position change
- (23) 17-03, MP 15-0008, open phase condition protection
- (24) 18-05, Request for Resolution (RFR) 190015, temperature requirements for Ultimate Heat Sink (UHS) freeze protection
- (25) CA2510/01391, Surveillance Test Risk-Informed Documented Evaluation (STRIDE) 19-05, Callaway 18-month NK battery and battery charger surveillances
- (26) CA2510/01466, replace isophase bus welded flexible links
- (27) CA2511/19005216.250, re-energizing NN03 bus via NN13 bypass source (with NN13S1, maintenance bypass switch, in bypass position)
- (28) CA2511, MP 15-0008, open phase condition protection
- (29) CA2511/OTO-SA-00001, Engineered Safety Features Actuation System (ESFAS) verification and restoration
- (30) CA2511/01082, MP 16-0032, replace ESFAS and SB069 status panels

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following permanent modifications:

- (1) Main generator (MA01) modifications on June 12, 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) Essential service water to service water cross-connect valve testing under Job 20002062 on April 4, 2021
- (2) Alternate emergency power supply (AEPS) pull box inspection under Job 20504923 on May 10, 2021
- (3) Steam generator steam pressure transmitter ABPT0534, replacement under Job 10502135 on May 17, 2021
- (4) Residual heat removal train B suction valve EJHV8701B, motor replacement under Job 21002135 on June 3, 2021
- (5) Fire protection Halon function test under Job 20503422 on June 28, 2021

71111.20 - Refueling and Other Outage Activities

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

- (1) The inspectors evaluated the main generator forced outage activities from April 1 to June 30, 2021

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (4 Samples)

- (1) Steam generator blowdown system surveillance testing on April 3, 2021
- (2) Mode 5 surveillances for the reactor coolant system including residual heat removal system venting under Procedure OSP-SA-00003 on April 7, 2021
- (3) Reactor building exterior inspection under Job 17504654 on April 18, 2021
- (4) Floor drain valve testing under Procedure OSP-LF-00001 on April 30, 2021

Inservice Testing (IP Section 03.01) (1 Sample)

- (1) Residual heat removal and reactor coolant system check valve inservice test under Procedure OSP-EJ-PV04A, on April 27, 2021

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS05: Safety System Functional Failures (SSFFs) Sample (IP Section 03.04) (1 Sample)

- (1) April 1, 2020, through March 31, 2021

MS08: Heat Removal Systems (IP Section 03.07) (1 Sample)

- (1) April 1, 2020, through March 31, 2021

BI01: Reactor Coolant System (RCS) Specific Activity Sample (IP Section 03.10) (1 Sample)

- (1) April 1, 2020 through March 31, 2021

71152 - Problem Identification and Resolution

Semiannual Trend Review (IP Section 02.02) (1 Sample)

- (1) The inspectors reviewed the licensee's corrective action program for potential adverse trends in the containment spray pumps and motors that might be indicative of a more significant safety issue.

Annual Follow-up of Selected Issues (IP Section 02.03) (1 Sample)

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

- (1) Thermal overload setpoints on the train B containment spray pump room cooler and train C containment cooling fan under Condition Reports 202102615 and 202102802 on May 6, 2021

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

Event Report (IP Section 03.02) (5 Samples)

The inspectors evaluated the following licensee event reports (LERs):

- (1) LER 05000483/2020-001-01, Emergency Exhaust Train Inoperable Due to Fan Belt Degradation and Failure (ADAMS Accession No. ML21040A515). The inspectors reviewed the updated LER submittal. The previous LER submittal was reviewed in Inspection Report 05000483/2020004 and the circumstances surrounding this LER were previously documented in the Inspection Results section of that report. This LER is closed.
- (2) LER 2020-002-01, Reactor Trip and [auxiliary feedwater] AFW Actuation Following Spurious Main Feedwater Regulating Valve Closure (ADAMS Accession No. ML21040A521). The inspectors reviewed the updated LER submittal. The previous LER submittal was reviewed in Inspection Report 05000483/2020004 and the inspection conclusions are documented in the Inspection Results section of that report. This LER is closed.
- (3) LER 05000483/2020-007-00, "B" Pressurizer Power-Operated Relief Valve Inoperable Due to Nonconformance with [environmental qualification] EQ Requirements (ADAMS Accession No ML20366A103). The inspectors reviewed the LER submittal. The inspectors determined that the cause of the condition described in the LER was not reasonably within the licensee's ability to foresee and correct and therefore was not reasonably preventable. No performance deficiency nor violation of NRC requirements was identified. This LER is closed.
- (4) LER 2020-008-00, Reactor Trip due to Main Generator Electrical Fault (ADAMS Accession No. ML21049A109). The inspection conclusions associated with this LER

are documented in this report under the Inspection Results Section. This LER is closed.

- (5) LER05000483/2021-001-00, Manual Actuation of Essential Service Water System (ADAMS Accession No. ML21098A254). The inspection conclusions associated with this LER are documented in this report under the Inspection Results Section. This LER is closed.

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

60855 - Operation of an Independent Spent Fuel Storage Installation (ISFSI)

The inspectors performed a review of the licensee's ISFSI activities to verify compliance with requirements of the Certificate of Compliance 72-1040, License Amendment 0, the HI-STORM UMAX Final Safety Evaluation Report (FSAR), Revision 2, and HI-STORM FW FSAR, Revision 3. The inspectors reviewed selected procedures, corrective action reports, and records to verify ISFSI operations were compliant with the Certificate's Technical Specifications, requirements in the FSAR, and NRC regulations.

Operation of an ISFSI (1 Sample)

- (1) The inspectors evaluated the licensee's dry cask storage operations, from April 26 - 30, 2021, during an on-site inspection. The Callaway ISFSI is located within the Part 50 reactor's protected area. The UMAX ISFSI vault was designed to hold 48 multi-purpose canisters, each with 37 spent fuel assemblies (MPC-37). The UMAX was situated in a 6 by 8 array. At the time of the routine loading inspection, the Callaway UMAX ISFSI contained a total of 24 canisters, and the licensee was in the process of loading and processing the 25th canister in the spent fuel building. At the end of the loading campaign (early June 2021), the licensee had a total of 30 canisters at the ISFSI.

During the on-site inspection, the inspectors evaluated and observed the following activities:

- walkdown of the ISFSI haul path
- fuel assembly selection and placement into the 25th canister
- heavy load lifts using the cask handling crane to remove the transfer cask with the loaded canister from the spent fuel pool to the canister processing area
- welding and non-destructive testing of the lid-to-shell weld
- processing of the spent nuclear fuel for storage, including bulk water removal, forced helium dehydration, and helium backfill operations
- final sealing of the canister, including welding of the vent and port cover plates, non-destructive testing, and helium leak-testing
- transportation of the 25th canister on the vertical cask transporter from the spent fuel building to the ISFSI

The inspectors reviewed and evaluated the following documentation during the inspection:

- fuel selection evaluations for the canisters loaded since the last NRC ISFSI inspection, the inspectors reviewed the contents of canisters 11 to 25 against the license's technical specifications for approved contents

- radiation surveys for dose at the owner-controlled boundary to verify compliance with the requirements of 10 CFR 72.104 for calendar years 2018, 2019, and 2020
- selected ISFSI related condition reports issued since the last NRC ISFSI inspection (August 2018)
- quality assurance (QA) program implementation, including recent QA audits, surveillances, receipt inspection, and quality control activities related to ISFSI operations
- compliance to technical specifications for operational surveillance activities and FSAR-required annual maintenance activities
- documentation of annual maintenance activities for the site's cask handling crane, vertical cask transporter, and special lifting devices
- selected licensee design changes and program changes to the ISFSI performed under the site's 10 CFR 72.48 program
- changes made by the licensee in the site's 10 CFR 72.212 evaluation report from Revision 3-5

INSPECTION RESULTS

Observation: Semi-Annual Trend Review	71152
<p>The inspectors reviewed the licensee's corrective action program, performance indicators, system health reports, and other documentation to identify trends that might indicate the existence of a more significant safety issue related to the containment spray pumps.</p> <p><u>Background</u></p> <p>The inspectors reviewed condition reports associated with high particulate counts in lubrication oil for the containment spray (CS) pump motors. The inspectors noted that starting in 2006, oil sample reports show high particulates in these oil samples. Among the 20 specific parameters monitored, the licensee monitors the oil for particles of six different size categories ranging from 4 microns (μm) to 40 μm.</p> <p>The licensee monitors the performance of CS pump motors using oil samples, vibrations, and other performance data. Procedure EDP-ZZ-01126, "Lubrication Predictive Maintenance Program," Revision 21, contains specifications and monitoring requirements for the four oil reservoirs (two motors, each with upper and lower bearings). It states that elevated particulates should be monitored but are not, in and of themselves, an immediate concern for the motor. The inspector noted that this procedure provides target values for particulates to not exceed certain thresholds (e.g., >10,000 particles per ml for 4 μm particles, >5,000 particles per ml for 6 μm particles), but it contains no threshold for initiating corrective action.</p> <p>As a specific example of high particulate counts, the inspectors reviewed the oil analysis for the lower bearing oil reservoir on the train A CS pump motor. All eight samples drawn since 2011 were above the increased monitoring thresholds and six samples had off-scale high counts for 4 μm particles with a value of 99,999 particles per milliliter (ml). Similarly, the 6 μm particles exceeded the target threshold and ranged from 5421 particles/ml to 84,965 particles/ml. The inspectors noted that other specific parameters that are monitored for evidence of bearing wear, such as iron, were not at values of concern and there was no water in the oil.</p>	

The licensee increased the frequency of sampling and changing the oil in the CS pump motors due to the elevated particulate values in 2013 from every 6 years to every 2 years. Further, the licensee recently assigned an action under Condition Report 202102501 to revisit this and determine if the frequency should remain the same or be increased.

The inspectors requested additional information on the potential source of the elevated particulates. The licensee had a third-party lab perform analytical ferrography to characterize the particulates. The lab determined the 4-6 μm particles included moderate amounts of abrasive, dust, and dirt with a few ferrous wear and black oxide particles. Based on limited wear components, the sample was characterized as indicating good bearing health including rolling wear, cutting wear, and rubbing wear in the lowest category.

Inspector Assessment

The inspectors determined that the licensee has been unsuccessful at removing particulates because they have not been able to completely drain the oil and flush the reservoirs. As documented in Condition Reports 201801839, 201801876, 201805238, and 202003408, the licensee has struggled with removing the recessed drain plugs since at least 2015. Instead, the work instructions for oil changes allowed technicians to drain oil via the sight-glass if the drain plug could not be removed, which does not permit draining the lower portion of the bearing reservoir. In 2018, under Condition Report 201801876, the licensee updated work instructions to require an additional level of supervisor approval prior to using an alternate method such as sight-glass draining. For this reason, there is not significant documentation, such as condition reports, of the drain plug issues prior to 2018.

The licensee assigned an action under Condition Report 202102501 to replace the drain plugs with a new design and started planning the work tasks under Job 21001628. The request for resolution (RFR) used to initiate the design change for the drain plug was previously captured in RFR 180175, created in 2018, but was later cancelled in 2019. This design change was then re-approved in 2020 under RFR 200070. Although the design and condition report action to replace the drain plugs for both CS pump motors are approved, the licensee still has not scheduled the replacement work. At the time of this report, the licensee was looking approximately two refueling outages into the future as the likely target implementation date.

Inspector Conclusions

The inspectors concluded the licensee has been tolerating high particulate in all four CS pump motor bearing reservoirs for 10 years. The licensee's lubrication predictive monitoring program does not contain any required actions for high particulate content to drive resolution of that condition even though the 4 μm particles are off-scale high and they are not able to measure or trend the actual current particle content. This has enabled the licensee to cancel and delay planned modifications to replace the problematic drain plugs rather than resolve the problem and the underlying cause.

The inspectors noted that the licensee did not use a risk assessment to schedule the modification needed to resolve the problem, but if a CS pump motor failed with the plant in Mode 1, the replacement activity would likely exceed the Technical Specification 3.6.6 allowed outage time of 72-hour completion time and result in an unplanned shutdown based on discussions with engineering personnel.

The inspectors noted that immediate operability determinations (IODs) for condition reports associated with elevated particulates in containment spray pump lube oil systems, including Condition Reports 202102501 and 202102454, stated that the pumps are operable but may result in reduced bearing life and premature degradation. However, the licensee has tolerated the condition for over 10 years without assessing the impact of reduced bearing life or examining the condition of the bearings. As a result of NRC questions, the licensee assigned an action under Condition Report 202102501 to evaluate the cumulative run time of the pumps and assess any impact to bearing life.

In summary, although there is not any indication of an imminent risk or failure of either CS pump motor, the licensee has not prioritized addressing a long-standing degraded condition for the CS pump motors.

Reactor Trip Due to Design and Maintenance Failures Associated with the Main Generator

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000483/2021002-01 Open/Closed	[H.14] - Conservative Bias	71153

The inspectors reviewed a self-revealing, Green finding and associated non-cited violation of Technical Specification 5.4.1.a, "Procedures," for the licensee's failure to properly pre-plan and perform maintenance on the main generator that affected safety-related components. Specifically, the scope of planned work changed significantly as new problems were discovered, errors occurred, and planning inadequacies became apparent. The licensee did not implement appropriate risk mitigating actions such as providing additional vendor oversight or obtaining third party expertise. As a result, the main generator experienced an electrical fault at 90 percent power, the reactor tripped, and safety systems responded to stabilize the plant in Mode 3.

Description: On October 7, 2017, the licensee began a planned refueling outage where contractors performed a major main generator modification. This modification replaced the stator (the non-rotation part of the generator) with new components of a different design. After the work was complete the final electrical resistance values of the new stator were identified to be lower than design but acceptable. After attempting some improvements, the licensee decided to defer work on restoring the stator to design resistance values to a future refueling outage. The licensee started up the plant on December 17, 2017.

On September 27, 2020, the licensee started the fall refueling outage early due to an electrical fault in the isophase bus ducts that contain the high-voltage conductors that pass the electrical output of the generator causing a reactor trip. See the Inspection Results section of NRC Integrated Inspection Report 05000483/2020004, ADAMS Accession No. ML21040A410, for additional information on this reactor trip. During this outage, the licensee brought back the main generator contractors to perform rework on the stator with the goal of restoring resistance readings to design values and correct other problems that developed during the previous two operating cycles. As part of this effort, several types of issues associated with the main generator were identified that challenged the licensee: contractor work quality, design error, inadequate work instructions/planning, and licensee oversight of contractors.

Condition Reports	Subject	Issue Types
202005251	Foreign material found in main generator hydrogen seals with damage identified on initial as-found inspection	Contractor work quality, licensee oversight of contractors
202005520, 202006195, 202006243	Stator cooling water in-line strainer flow rate exceeded design specifications resulting in the strainer coming apart. Stator cooling water strainer screen found degraded and missing portions were located inside the main generator as foreign material on initial as-found inspection.	Design error, licensee oversight of contractors
202005410	During removal, the main generator's rotor was oriented incorrectly when placed on its stand and was resting on wedges. This required unplanned inspection to ensure the rotor was not damaged.	Contractor work quality, licensee oversight of contractors, inadequate work instructions
202005657, 202005701	During stator rework, reductions in planned stator insulation thickness were required due to inadequate clearances between phase connections and stator windings.	Contractor work quality, design error, licensee oversight of contractors, inadequate work planning
202005885, 202006034	During stator rework, stator copper conductor material removal was required to allow sufficient clearance for insulation installation. The scope of stator copper conductor removal was later increased when additional locations were identified. During the work, copper removal from one location exceeded allowable specifications.	Contractor work quality, design error, licensee oversight of contractors, inadequate work planning
202006019	During stator rework, insulation installation processes were changed by the contractor, during mock-up testing without informing the licensee	Licensee oversight of contractors
202006271, 20206640, 20206645	During stator rework, a circumferential crack and localized overheating was identified on an internal distribution header requiring replacement of the damaged portion.	Contractor work quality, design error, licensee oversight of contractors
202005446, 202006636, 202006638	Throughout stator rework, contractor personnel were impacted by the pandemic, requiring new, less proficient teams to take over in-progress work.	Contractor work quality, licensee oversight of contractors
202006552, 202006673	During stator rework, stator cooling water hose ferrule collars were over-tightened, damaging stator hose connector locations and requiring repair.	Contractor work quality, licensee oversight of contractors, inadequate work planning
202006899, 202006901	A water leak was identified from a hose connection during stator cooling water flushing. The hose was determined to have been nicked during recent insulation work and the hose required replacement. Further,	Contractor work quality, licensee oversight of contractors, inadequate work planning

	water leaks during stator cooling water flushing introduced water into isophase bus ducts.	
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After resolving the above issues and completing the other planned outage activities, the licensee started up the reactor on December 19, 2020. During power ascension on December 24, 2020, the licensee received several abnormal indications and annunciator alarms associated with the main generator instrumentation and auxiliary systems. These indications included increasing stator cooling water conductivity and increasing hydrogen leakage from the main generator cooling system around 12:08 pm. The control room staff stopped the planned power ascension at 90 percent reactor power and dispatched non-licensed operators to the field investigate the alarms. At 12:35 pm, the reactor tripped due to a main generator fault and main turbine trip. The plant was stabilized in Mode 3, using auxiliary feedwater, and the licensee began an investigation into the cause of the trip. This event is documented in Licensee Event Report (LER) 2020-008-00, "Reactor Trip due to Main Generator Fault," ADAMS Accession No. ML21049A109.

The post-fault initial inspections of the main generator internals identified significant damage to hoses and piping used to route cooling water to the stator components. Further, the licensee observed the remnants of melted metal and hose material, black soot, and oily residue in several portions of the main generator enclosure. This information was captured in Condition Report 202007437. The licensee formed a root cause team to investigate the cause of the generator fault and reactor trip under Condition Report 202007410.

The licensee's root cause evaluation concluded that on December 24, 2020, the main generator fault was caused by the failure of the portion of a distribution header that was replaced in the fall 2020 refueling outage. This component cracked from a combination of residual stresses from the repair work and resonant vibrations from inadequate bolting during maintenance. As a result, hydrogen used to cool the main generator entered the stator cooling water system, displaced cooling water, disrupted cooling water flow, and led to localized overheating failure of internal conductors to the main generator stator. This original failure then cascaded to other locations in the main generator. In their cause report, the licensee noted that the contractor was not proficient in the repair work performed. The licensee identified that Callaway's engineering and project management programs did not adequately challenge and verify the contractor's plan prior to installation, such as using third-party reviewers, for a unique main generator design. Further, the licensee identified that Callaway did not establish an adequate post-startup monitoring plan to assess the performance of the main generator under load.

The inspectors independently reviewed the issues, associated condition reports, and root cause evaluation for the main generator fault. The inspectors noted that there were examples of as-found damage when the main generator was initially opened at the start of the fall 2020 refueling outage that originated from poor contractor work practices and design errors in the 2017 refueling outage. Specifically, the licensee found examples of damaged or degraded main generator components after only a few years of service, such as foreign material in the hydrogen coolers and the failure of stator cooling water strainers under their design flow conditions. Next, the inspectors noted that there were several additional precursor issues identified during the fall 2020 refueling outage that demonstrated a lack of adequate oversight of the main generator design and contractor work practices. These issues resulted in damaged components such as cut stator water cooling hoses, and design issues such as difficulties performing tasks between adjacent conductors with low clearances.

Ultimately, the inspectors concluded that the licensee failed to properly pre-plan the work on the main generator which contributed to a reactor trip. Despite significantly changing the main generator work scope from problems being identified, including unusual conditions with incomplete information, the licensee did not implement appropriate risk mitigating actions to increase contractor oversight. The inspectors noted that Callaway Plant is the NRC licensee and is responsible for activities taking place on-site including contractor work. The combination of various main generator issues, in aggregate, did not result in an appropriate level of oversight of the contractors and main generator design. The inspectors concluded that the lack of an adequate post-startup monitoring plan after all of the issues encountered during the outage and the technical complexity of the work indicated that the licensee did not have an adequate conservative bias to identify and mitigate problems that might occur while placing the main generator into service following significant generator project.

Corrective Actions: In response to the trip, operators stabilized the plant in Mode 3. The licensee performed a root cause evaluation, implemented a major modification to the main generator to replace the stator with a different design, inspected the main generator rotor, and modified main generator auxiliary systems. Further, the licensee revised standards for contractor oversight and project management to include additional verifications of design changes such as through a third-party with technical capabilities in the subject.

Corrective Action References: Condition Report 202007410

Performance Assessment:

Performance Deficiency: The failure to properly preplan main generator work and provide adequate oversight of contractor design, maintenance work, and testing on the main generator project was a performance deficiency. Specifically, the scope of work changed significantly as new problems were discovered, errors occurred, and planning inadequacies became apparent. The licensee did not implement appropriate risk mitigating actions such as additional vendor oversight, obtaining third party expertise or increased monitoring and testing.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the performance deficiency resulted in challenging safety systems which were required to initiate an automatic reactor trip, isolate main feedwater, and initiate auxiliary feedwater to reach safe-shutdown conditions.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The finding was determined to be of very low safety significance (Green) under Exhibit 1, "Initiating Events Screening Questions," because while the finding did cause a reactor trip, it did not also result in the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. Specifically, safety systems remained available and the plant responded per design without any complications.

Cross-Cutting Aspect: H.14 - Conservative Bias: Individuals use decision-making practices that emphasize prudent choices over those that are simply allowable. A proposed action is determined to be safe in order to proceed, rather than unsafe in order to stop. The inspectors determined that the finding had a Human Performance cross-cutting aspect associated with

Conservative Bias in that plant leadership did not ensure that conservative assumptions were used when determining whether changing work scope could be conducted safely. Further, station leadership did not take a conservative approach to decision-making when information was incomplete or conditions were unusual. Specifically, the licensee did not demonstrate a conservative bias to the combination of unexpected conditions encountered with the main generator and vendor errors by increasing their oversight by obtaining additional technical expertise, or conducting a thorough readiness review in order to ensure the condition of the main generator was suitable for reliable operation prior to placing it in service.

Enforcement:

Violation: Technical Specification 5.4.1.a, "Procedures," requires that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Revision 2, Appendix A, Section 9.a, requires, in part, that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures and documented instructions appropriate to the circumstances.

Contrary to the above, from September 27, 2020, through December 24, 2020, the licensee failed to properly pre-plan and perform maintenance that could affect the performance of safety-related equipment. Specifically, defects caused by repair work and design changes to the main generator caused the failure of stator water cooling piping and a main generator fault that affected the performance of safety-related equipment by causing a reactor trip and safety system actuations. Throughout the project, the scope of work changed significantly as new problems were discovered, errors required rework occurred, and planning inadequacies became apparent.

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

Minor Violation

71153

Minor Violation: While reviewing LER 05000483/2021-001-00, "Manual Actuation of Essential Service Water System," (ADAMS Accession No. ML21098A254), the inspectors identified a minor violation. Technical Specification 5.4.1.a, Procedures, states in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures listed in Regulatory Guide 1.33, "Quality Assurance Program Requirements," Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Revision 2, Appendix A, Section 9, "Procedures for Performing Maintenance," requires, in part, that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances.

Contrary to the above, from January 26 through February 9, 2021, the licensee failed to properly pre-plan and perform a pipe repair on the common lube water supply header to the non-safety service water (SW) pumps in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances.

Specifically, the licensee installed a temporary alteration in support of maintenance (TASM) to provide lube water to the SW pumps while repairing the pipe leak in the permanent lube water system. The configuration of the TASM prevented the licensee from back flushing the

SW Y-strainer and guidance was provided to clean the SW Y-strainer if lube water pressure and flow could not be maintained; however, the licensee failed to generate a contingency task or establish plant conditions to clean the Y-strainer. With the TASM installed, lube water pressure and flow degraded until both running SW pumps tripped and locked out on low lube water pressure.

The loss of the non-safety SW pumps resulted in the licensee manually starting both trains of the safety-related essential service water system to restore cooling flow until the SW system could be restored. The SW pump trip and lockout did not result in the loss of any safety-related function since the essential service water system is the credited system for achieving and maintaining safe shutdown.

Screening: The inspectors determined the performance deficiency was minor. This performance deficiency was screened in accordance with Inspection Manual Chapter 0612, Appendix B, "Issue Screening," dated December 10, 2020, and was determined to be of minor significance because the performance deficiency could not be reasonably viewed as a precursor to a significant event, would not have the potential to lead to a more significant safety concern if left uncorrected and did not adversely affect a cornerstone objective.

Enforcement: This failure to comply with Technical Specification 5.4.1.a, Procedures, constitutes a minor violation that is not subject to enforcement action in accordance with the NRC's enforcement Policy.

The licensee entered this into their corrective action program as Condition Report 202100780 to restore compliance. This minor violation closes LER 05000483/2021-001-00.

EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed that proprietary information was controlled to protect from public disclosure.

- On May 3, 2021, the inspectors presented the Callaway ISFSI routine inspection results to Mr. B. Cox, Site Vice President, and other members of the licensee staff.
- On June 24, 2021, the inspectors presented the Evaluations of Changes, Tests, and Experiments (IP 71111.17T) Inspection results to Mr. F. Bianco, Senior Director of Nuclear Operations, and other members of the licensee staff.
- On July 7, 2021, the inspectors presented the Integrated Resident 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
60855	Engineering Changes	EMPRV job 19005219.115	Temporary shield platform on ISFSI pad for low dose wait area	0
		MP 19-0119	RFR 190016 – Design Change Package for 2021 ISFSI Loading Campaign	0
		MP 20-0004	RFR 180177 - Fuel Building 100A, 480V, 3 Phase Weld Receptacle	0
		PM1008270	Perform HI-TRAC inspection per HI-STORM FW and UMAX FSAR	0
	Engineering Evaluations	CA 3415	10 CFR 72.212 Evaluation Report Callaway Plant	5
71111.01	Corrective Action Documents	Condition Reports	200810481, 201005432, 201105051, 201109098, 201903514, 202003794, 202005792, 202103367	
	Miscellaneous	MP 10-0053	SSPS Printed Circuit Board Power Supply & Master Test Relay Requirements	3
		Westinghouse TB 13-07	Solid State Protection System New Design Universal Logic Board & Safeguards Driver Board 48VDC Input	12/10/2013
	Procedures	ISP-SA-2320A	Unblocked Actuation Slave Relay K626 – Train A	0
		ITM-SB-0001	SSPS Power Supply Predictive Maintenance	11
		OSP-SA-2413A	Train A Diesel Generator & Sequencer Testing	29
		OTN-EF-00001	Essential Service Water System	79
		OTS-SB-0002A	Placing SSPS Train A in Test in Modes 5, 6 & No Mode	7
71111.04	Corrective Action Documents	Condition Reports	202000316, 202003345, 202004338, 202004392, 202005891, 202005909, 202007304, 2020007421, 202101189, 202100129, 202101521, 2021001537, 202101588, 202101812, 202101972, 2021002484, 202102764, 202103032	
	Miscellaneous	Job 18506700	Replace Starting Batteries	
		MP 12-021	TSC/EOF D/G Digital Upgrade Control Kit	0.1
	Procedures	EPGUB51	Technical Support Center Emergency Generator	15
		MSE-ZZ-QS006	NLI/Square D Masterpact Circuit Breaker Preventative Maintenance and Inspections	12

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		OSP-SB-P0002	Train A and Train B Safety Injection Comprehensive Pump Test	0
		OTN-GK-00001	Control Building HVAC System	64
		OTS-ZZ-00002	Technical Support Center Diesel Generator Functional Test	29
71111.05	Corrective Action Documents	Condition Reports	200804182, 202005622, 201010734, 202101097, 202101125, 202101127, 202102437	
	Miscellaneous		Fire Pre-Plan	Various
	Procedures	APA-ZZ-00701	Control of Fire Protection Impairments	26
		APA-ZZ-00741	Control of Combustible Materials	38
FPP-ZZ-00100		Site Wide Fire Protection Inspection Procedure	14	
71111.06	Corrective Action Documents	Condition Reports	200901922, 200903925, 201805151, 201806566, 202003241, 202102234, 202102964	
	Miscellaneous	Job 18004225	Open cable trenches to perform initial inspection for license renewal	
		M-FL-02	Determine Floor Levels in Auxiliary Building Rooms	1
		M-FL-10	Maximum Flood Level for Rooms in the Diesel Generator Building	3
		M-FL-11	Auxiliary Building Flooding	2
		M-FL-17	Summary of Flood Levels	0
		RFR 20102	Cables in Switchyard Trenches Submerged/Wetted	0
	Procedure	APA-ZZ-00750	Hazzard Barrier Program	48
APA-ZZ-00750		Hazard Barrier Program	48	
71111.11Q	Corrective Action Documents	Condition Reports	202103287, 201504294, 201605725	
	Procedures	OSP-AL-P0002	Turbine Driven Auxiliary Feedwater Pump Inservice Test – Group B	82
		OSP-BB-VL005	BBV00001, 22, 40, 59, and EM8815 Inservice Test – IPTE	23
		OTG-ZZ-00001	Plant Heat-up: Cold Shutdown to Hot Standby	95
		OTG-ZZ-00003	Plant Startup: Hot Zero Power to 30% Power – IPTE	64
		OTG-ZZ-00004	Power Operations	100
		OTN-EJ-00001	Residual Heat Removal System	28
		OTN-EM-00001	Safety Injection System	38
OTO-BB-00002	RCP Off-Normal	35		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.12	Corrective Action Documents	Condition Reports	201902387, 202000567, 202007130, 202100385, 202101533, 202102237, 202102453, 202102540	
	Miscellaneous	CA0176	Temporary Configuration Change Tracking	2
		OQAM	Operating Quality Assurance Manual	35
	Procedures	APA-ZZ-00103	EOP Program Procedure	
		APA-ZZ-00315	Configuration Risk management Program	15
		APA-ZZ-00322, Appendix C	Job Planning	60
		APA-ZZ-00605	Temporary System Modifications	41
		EDP-ZZ-04024	Configuration Control	35
EOP Addendum 19	Aligning ESW to AFW Suction	4		
71111.13	Miscellaneous		Forced Outage 73 Shutdown Safety Management Plan	6
		NUMARC 93-01	Industry Guidelines for Monitoring the Effectiveness of maintenance at Nuclear Power Plants	4
	Procedures	APA-ZZ-00322, Appendix F	Online Work Integrated Risk Management	18
		APA-ZZ-01250	Operational Decision Making	18
		EDP-ZZ-01128, Appendix 1	SSCs in the Scope of the Maintenance Rule at Callaway	11
ODP-ZZ-0002, Appendix 2	Risk management Actions for Planned Risk Significant Activities	17		
71111.15	Corrective Action Documents	Condition Reports	201701448, 202102131, 202102237, 202102548, 202102868	
71111.17T	Corrective Action Documents	Condition Report	201706241, 201804069, 201804473, 201805523, 201901379, 202004939, 202001155, 201903261, 201801822, 201801943, 201800700, 201801263, 201905733, 201902075, 202000441, 202101851, 201901943, 201608055, 201801260, 201803313	
	Corrective Action Documents Resulting from Inspection	Condition Reports	202103507, 202103550	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Engineering Changes	Design Change Package - MP 17-0006	ESW Water Hammer Mitigation Modification	2
		Design Change Package - MP 17-0006	ESW Water Hammer Mitigation Modification	2
		Design Change Package - MP 18-0040	Contingency Modification for RPV Stuck Stud Removal	3
		Design Equivalent Change Package - MP 18-0042	ESW Water Hammer Modification - CRAC Tie Ins	2
		Design Equivalent Change Package - MP 19-0113	ESW Water Hammer Mitigation Phase 2	1
		Engineering Disposition - MP 03-1002	Main Feedwater Pump Turbine Control System Replacement	11
		Field Change Request - MP 18-0042	ESW Water Hammer Modification - CRAC Tie Ins	0
		Field Change Request - MP 18-0042 FCR02	ESW Water Hammer Mitigation - CRAC Tie Ins	1
		MP 16-0032	Replace ESFAS and SB069 Status Panels	0
		MP 21-0006	Replace Isophase Bus Welded Flexible Links	0
	Engineering Evaluations	RFR 200113	Document Acceptance of TMRE to Resolve Tornado Missile Protection Non-Conformances	0
	Miscellaneous	50.59 Evaluation - MP 03-1002	Main Feedwater Pump Turbine Control System Replacement	2
		50.59 Evaluation - MP 17-0006	ESW Water Hammer Mitigation Modification	0
		50.59 Evaluation - MP 19-0103	Hot leg Recirculation Valve Position Change and Mission Time Basis Documentation.	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		50.59 Evaluation for Operator Actions - MP 19-0103	Hot Leg Recirculation Valve Position Change and Mission Time Basis Documentation	0
		50.59 Evaluation: Operator Actions - MP 03-1002	10CFR50.59 Evaluation; Revision/Sequence 1, Questions for New or Modified Operator Action(s).	0
		50.59 Screen - EOP ADD 19	Aligning ESW To AFW Suction	4
		50.59 Screen - MP 17-0006	ESW Water Hammer Mitigation Modification	0
		50.59 Screen - MP 18-0040	Contingency Modification for RPV Stuck Stud Removal	0
		50.59 Screen - MP 19-0113	ESW Water Hammer Mitigation Phase 2	0
		50.59 Screen - OSP-EF-P001A	ESW Train A Inservice Test	81
		50.59 Screen - OSP-JE-PO01A	Train A Emergency Diesel Generator Fuel Oil System Inservice Tests	30
		Applicability Determination - MSM-ZZ-QV006	Generic Inspection of Swing Check Valves	0
		Applicability Determination - OSP-BB-LL022	Containment Isolation Valve Leak Rate Test	12
		Applicability Determination - OSP-EF-V001A	ESW Train A Valve Operability	51
		E-009-00242	ABB Power Distribution, Inc. - Instructions for Phase Unbalance Relay	47
		E-009-00338	Class 1E Electrical Equipment Qualification 60Q Phase Unbalance Relay	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		Surveillance Test Risk-Informed Documented Evaluation (STRIDE) 19-05	Callaway 18 Month NK Battery and Battery Charger Surveillances	0
		Westinghouse Letter -SCP-18-27, Rev 1	Ameren Missouri, Callaway Plant, Transmittal of Trains A and B Base Case Models for Callaway Water Hammer	04/16/2018
	Procedures		Callaway 10 CFR 50.59 Resource Manual	5
		APA-ZZ-00143	10 CFR 50.59 AND 10 CFR 72.48 REVIEWS	19
		APA-ZZ-00500 Appendix 1	Operability Determinations	36
		APA-ZZ-01023	Primary-to-Secondary Leakage Program	28
		CTP-ZZ-02590	Primary to Secondary Leak Rate Determination	54
		E-0	Reactor Trip or Safety Injection	21
		EOP ADD 19	Aligning ESW to AFW Suction	4
		ESP-ZZ-01016	ASME Section XI IWE Containment Pressure Boundary Inspection	11
		MSM-ZZ-QV006	Generic Inspection of Swing Check Valves	0
		OSP-BB-LL022	Containment Isolation Valve Leak Rate Test	12
		OSP-EF-P001A	ESW Train A Inservice Test	81
		OSP-EF-V001A	ESW Train A Valve Operability	51
		OSP-JE-PO01A	Train A Emergency Diesel Generator Fuel Oil System Inservice Tests	30
		OTN-AL-00001	Auxiliary Feedwater System	35
		OTN-GK-00001	Control Building HVAC System	54
		OTO-SA-00001	ESFAS Verification and Restoration	44
		Self-Assessments	CR 202003269-005	2021 10 CFR 50.59 Callaway Self-Assessment
	71111.19	Corrective Action Documents	Condition Reports	202102672, 202102683, 202103140, 202103222, 202103245, 202103286
Procedures		APA-ZZ-00322, Appendix E	Post-Maintenance Test Program	16
		APA-ZZ-00340,	Surveillance Frequency Control Program STI List	15

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		Appendix 4		
		ISF-AB-OP534	S/G Press Op Test Loop 3 Protection 1	23
		ISL-AB-OP534	S/G Press Channel Cal Loop 3 Protection 1	28
	Work Orders		10502135, 20513698, 21002135	
71111.20	Procedures		Forced Outage 73 Shutdown Safety Management Plan	6
71111.22	Corrective Action Documents	Condition Reports	202101548, 202102119, 202102418	
	Miscellaneous	PM1008315	Train A RHR System Venting	
		PM1008316	Train B RHR System Venting	
	Procedures	ODP-ZZ-00016	Reactor Operator Watchstation Practices and Logs	83
		OSP-EJ-PV04A	Train A RHR and RCS Check Valve Inservice Test	18
		OSP-EJ-PV04B	Train B RHR and RCS Check Valve Inservice Test	21
		OSP-SA-00003	Emergency Core Cooling System Flow Path Verification and Venting - Modes 1-4	53
	Work Orders		21501180	
		Job Order	19507229	10/10/2020
Job Order		195072555	10/10/2020	
71151	Corrective Action Documents	Condition Reports	200403784, 200900713, 201007829, 201103304	
	Miscellaneous		Control Room Logs	
			NRC Performance Indicator Transmittal Reports, Barrier Integrity Cornerstone	
			NRC Performance Indicator Transmittal Reports, Mitigating Systems Cornerstone	
			MSPI Basis Document	
	Procedures	RRA-ZZ-00001	NRC Performance Indicator Program	22
		APA-ZZ-01111	Mitigating Systems Performance Index (MSPI) Program Administration	6
KDP-ZZ-02000		NRC Performance Indicator Data Collection	20	
71152	Corrective Action Documents	Condition Reports	201801839, 201801876, 201805238, 202003408, 202004782, 202006922, 202100289, 202100235, 202100423, 202101831, 202102501, 202102516, 202103439	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Miscellaneous	NEI 99-02	Regulatory Assessment Performance Indicator Guidelines	7
		Job 200002801	Job Adjust MSK06 Alignment and Sensitivity as Needed to Support Pass Testing	0
		MP 20-0080	Protected Area Intrusion Detection System Configuration Change	0
		RFR 200171	Protected Area Intrusion Detections System Configuration Enhancement	0
	Procedures	APA-ZZ-00604	Requests for Resolution	39
		IP-ENG-001	Standard Design Process	1
		SDP-ZZ-00030	Security Plan Revision Process	16
		EDP-ZZ-01126	Lubrication Predictive Maintenance Program	21
		OTN-EM-00001	Safety Injection System	38
	71153	Corrective Action Documents	Condition Reports	202001783, 202007410