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

August 9, 2019

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

SUBJECT: CALLAWAY UNIT 1 – INTEGRATED INSPECTION REPORT 05000483/2019002

Dear Mr. Diya:

On June 30, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Callaway Plant. On July 2, 2019, the NRC inspectors discussed the results of this inspection with Mr. T. Herrmann, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspectors did not identify any finding or violation of more than minor significance.

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

Sincerely,

/RA/

Neil F. O'Keefe, Chief
Reactor Projects Branch B

Docket No.: 05000483
License No.: NPF-30

Enclosure:
Inspection Report 05000483/2019002
With Attachments:
Documents Reviewed
Request for Information Occupational Radiation Safety Inspection
Request for Information Public Radiation Safety Inspection

CALLAWAY UNIT 1 – INTEGRATED INSPECTION REPORT 05000483/2019002 – DATED August 9, 2019

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	05000483
License Number:	NPF-30
Report Number:	05000483/2019002
Enterprise Identifier:	I-2019-002-0006
Licensee:	Union Electric Company
Facility:	Callaway Plant
Location:	Steedman, MO 65077
Inspection Dates:	April 1 to June 30, 2019
Inspectors:	C. Alldredge, Senior Enforcement Specialist B. Baca, Health Physicist D. Bradley, Senior Resident Inspector R. Carrion, Senior Reactor Inspector P. Elkmann, Senior Emergency Preparedness Inspector N. Greene, Senior Health Physicist S. Janicki, Resident Inspector J. O'Donnell, Health Physicist B. Tharakan, Senior Project Engineer D. You, Resident Inspector
Approved By:	Neil F. O'Keefe, 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 the Callaway Plant in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information.

List of Findings and Violations

No findings or violations of more than minor significance were identified.

Additional Tracking Items

None.

PLANT STATUS

Callaway began the inspection period at approximately 20 percent power with a planned shutdown in progress for the refueling outage. On April 1, 2019, the licensee shut down the reactor and commenced the planned refueling outage. On April 17, with the reactor defueled and in no Mode, safety-related bus NB01 lost power and was automatically reenergized by the associated emergency diesel generator due to a loss of the 365 kV switchyard bus (NRC Event 54005). On May 11, with the reactor in Mode 4, the licensee identified an auxiliary building door that had been blocked open through reactor Mode ascension (NRC Event 54061). On May 16, the licensee commenced a reactor startup. Later that day, an automatic reactor trip occurred due to high flux in the source range (NRC Event 54069) when operators failed to block this trip when conditions called for them to do so. On May 17, the licensee commenced a reactor startup. On May 18, the licensee tripped the main turbine due to high vibrations and the reactor remained critical, by design, due to the low power level at the time of the turbine trip. The licensee restored the main turbine to service and connected the main generator to the electric grid on May 19. The licensee reached full power on May 22 and remained at this power level through the end of the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public 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 performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

Summer Readiness Sample (IP Section 03.01) (1 Sample)

The inspectors evaluated summer readiness of offsite and alternate alternating current (AC) power systems on June 5, 2019. The inspectors also reviewed the prioritization of efforts to restore offsite power to support Callaway, including a tour of the Ameren Transmission facility in St. Louis, for a design basis loss of offsite power event.

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) Essential service water trains A and B on April 22, 2019
(2) Emergency diesel generator train A on April 28, 2019

(3) Residual heat removal system train B on May 8, 2019
(4) Main turbine and electro-hydraulic control systems on June 4, 2019

71111.05Q - Fire Protection

Quarterly Inspection (IP Section 03.01) (5 Samples)

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

(1) Switchyard including switchyard control building, fire area S-15 on April 22, 2019

(2) Spent fuel pool, bridge, and laydown area, fire area FB-1 on May 10, 2019

(3) Control building 2016' elevation, fire areas C-13, C-15, C-17, and C-35 on May 29, 2019

(4) Spent fuel pool heat exchanger rooms and cask wash down area, fire area FB-1 on June 4, 2019

(5) Emergency diesel generator train A and essential switchgear train B, fire areas D-1 and C-10 on June 20, 2019

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 02.02a.) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the:

(1) Control building 1974' elevation, room 3101, on May 8, 2019

71111.07A - Heat Sink Performance

Annual Review (IP Section 02.01) (1 Sample)

The inspectors evaluated readiness and performance of:

(1) Component cooling water heat exchanger EEG01A on April 4, 2019

71111.08P - Inservice Inspection Activities (PWR)

PWR Inservice Inspection Activities Sample (IP Section 03.01) (1 Sample)

The inspectors verified that the reactor coolant system boundary, steam generator tubes, reactor vessel internals, risk-significant piping system boundaries, and containment boundary are appropriately monitored for degradation and that repairs and replacements were appropriately fabricated, examined and accepted by reviewing the following activities from April 8 through April 12, 2019:

03.01.a - Nondestructive Examination and Welding Activities

(1) NDE activity type: Magnetic Particle Testing (MT)

a) Pipe to flange weld (FW-01), Job #17002729, Task 180, Report 5010-19-0001, ASME Class 3

b) Pipe to crossover tee weld (FW-17), Job # 17002729, Task 500, Report 5010-19-0008, ASME Class 3

c) Pipe to elbow weld (FW-21), Job # 17002729, Task 500, Report 5010-19-0009, ASME Class 3

d) Pipe to crossover tee weld (FW-10), Job # 17002729, Task 500, Report 5010-19-0012, ASME Class 3

(2) NDE activity type: Ultrasonic Testing (UT)
a) RPV replacement stud 2, Report 19-000245, ASME Class1

(3) NDE activity type: Visual Testing (VT)
a) Fuel transfer system tube and flange, Job #17512708, Task 510, Report 5040-19-002, ASME Class IWE (VT-1)

03.01.b - Pressurized-Water Reactor Vessel Upper Head Penetration Examination Activities

(1) Penetration numbers 1 through 78, Job #13503632; no indications identified

03.01.c - Pressurized-Water Reactor Boric Acid Corrosion Control Activities

(1) Condition Report 201800861-002, boric acid screen and evaluation
(2) Condition Report 201801218-001, boric acid screen and evaluation
(3) Condition Report 201801218-002, boric acid screen and evaluation

03.01.d - No steam generator tube inspections were performed this inspection period

03.01.e - The inspectors reviewed 10 condition reports associated with inservice inspection related topics and determined that the licensee was entering issues into the corrective action program and taking appropriate actions to resolve

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)

The inspectors observed and evaluated licensed operator performance in the control room during:

(1) Reduced reactor coolant system inventory, including infrequently performed test or evolution (IPTE) briefs, on May 5, 2019
(2) Vacuum fill of the reactor coolant system on May 6, 2019

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

The inspectors observed and evaluated licensed operator training in the simulator for:

(1) Reactor start-up on May 6, 2019

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness Inspection (IP Section 02.01) (1 Sample)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

(1) Essential service water including butterfly valves on April 8, 2019

Quality Control (IP Section 02.02) (1 Sample)

The inspectors evaluated maintenance and quality control activities associated with the following equipment performance activities:

(1) Residual heat removal train A including hand-switches on June 21, 2019

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (4 Samples)

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

(1) Planned elevated risk during polar crane maintenance and operation on April 4, 2019

(2) Planned elevated risk for the train A work window on April 8, 2019

(3) Planned elevated risk during switchyard maintenance on April 2, 2019

(4) Planned elevated risk for reactor power ascension and recovery of a digital turbine hydraulics controller on May 20, 2019

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 02.02) (6 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) Dropped control rod H-8, Condition Report 201901077, on April 12, 2019

(2) Turbine-driven auxiliary feedwater pump internal inspection results, Condition Report 201902635, on April 17, 2019

(3) Reactor coolant motor-operated valve BBHV0016 stem nut wear, Condition Report 201902462, on April 18, 2019

(4) Switchyard breaker MDV45 failure to close, Condition Report 201902658, on April 18, 2019

(5) Essential service water failure analysis for valves EFHV0065 and EFHV0066, Condition Report 201806521, on May 9, 2019

(6) Control room air conditioning unit SGK04A degraded cooling capacity, Condition Report 201904050, on May 31, 2019

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 modification:

(1) Main turbine generator governor controls, MP 08-0027, on April 4, 2019

71111.19 - Post-Maintenance Testing

Post Maintenance Test Sample (IP Section 03.01) (7 Samples)

The inspectors evaluated the following post maintenance tests:

(1) Polar crane and load cell after equipment outage on April 6, 2019

(2) Ultimate heat sink cooling tower fans train B after equipment outage on April 12, 2019

(3) Essential service water modification MP 17-0006 on April 16, 2019

(4) 36 kV circuit breaker MDV55 after modification on April 22, 2019

(5) Main feedwater regulating valves AEFCV0510 and AEFCV0530 after equipment outage on May 5, 2019

(6) 125 Vdc battery NK11 after replacement on May 13, 2019

(7) Load shedding and emergency load sequencing train A after equipment outage on May 19, 2019

71111.20 - Refueling and Other Outage Activities

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

(1) The inspectors evaluated refueling outage RF23 from April 1 through May 22, 2019

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Inservice Testing (IP Section 03.01) (2 Samples)

(1) Pressurizer power operated relief valve inservice test in Mode 4 on April 3, 2019
(2) Component cooling water cross tie valves inservice testing on June 2, 2019

Reactor Coolant System (RCS) Leakage Detection Testing (IP Section 03.01) (1 Sample)

(1) RCS water inventory balance surveillance post-reactor startup from Refueling Outage RF23 on June 19, 2019

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

(1) Engineered safety features actuation systems train A on April 5, 2019

(2) Class 1E electrical equipment air conditioning system actuation and flow test on date May 11, 2019

(3) Turbine-driven auxiliary feedwater pump test in Mode 3 on May 15, 2019

71114.04 - Emergency Action Level and Emergency Plan Changes

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

(1) The inspectors evaluated Procedure EIP-ZZ-00101, Addendum 2, "Emergency Action Level Technical Basis Document," Revision 16, on May 1, 2019

This evaluation does not constitute NRC approval.

71114.06 - Drill Evaluation

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

(1) Team 4 full participation emergency response organization drill on June 6, 2019

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Contamination and Radioactive Material Control (IP Section 02.03) (1 Sample)

The inspectors evaluated licensee processes for monitoring and controlling contamination and radioactive material. The inspectors verified the following sealed sources are accounted for and are intact:

(1) 0029GZ
(2) 3217GN
(3) 81-616
(4) 0819GG/4660
(5) E-083/S-13
(6) CNP-148
(7) MRC-4108

High Radiation Area and Very High Radiation Area Controls (IP Section 02.05) (1 Sample)

The inspectors evaluated risk-significant high radiation area and very high radiation area controls.

Instructions to Workers (IP Section 02.02) (1 Sample)

The inspectors evaluated instructions to workers including radiation work permits used to access high radiation areas:

Radiation work packages

(1) R23HDDESTUD, Revision 0 - install stud tensioner hoists, deten0sion reactor vessel studs, remove reactor vessel studs, clean stud holes, lubricate stud holes, install stud hole plugs, and install guides studs/pins

(2) R23HDSTUD18, Revision 0 - Refuel 23 activities to remove reactor vessel stuck stud 18, including thread repairs, and inspect its stud hole; includes cutting, boring, QC/Engineering inspections, and associated cavity work (except cavity decontamination)

(3) R23STD18DECON, Revision 0 - RF23 upper cavity gross rinse, vacuum of seal ring, upper cavity decontamination, and reactor vessel flange cleaning to support removal of stuck reactor vessel stud 18, includes all Radiation Protection coverage and surveys

(4) R23ENGHRA, Revision 0 - R23 engineering activities inside high radiation areas in all radiologically controlled areas including the reactor building

(5) 16003707510, Revision 0 - RT new nipolet to valve weld on Valve EMV0161

Electronic alarming dosimeter alarms

(1) The licensee did not have an occurrence of a dosimeter alarm during the inspection period. The inspectors reviewed corrective action documents, radiation work permits and ALARA plans, as well as, interviewed workers to ensure the licensee was evaluating and controlling occupational worker exposures appropriately.

Labeling of containers

(1) Framatome core offloading/reloading and stuck stud removal equipment boxes
(2) Westinghouse fuel assembly inspection equipment boxes
(3) Pipefitters equipment boxes for the radiologically controlled area use
(4) Radioactive material (radioactive source) storage containers
(5) Radioactive material trash bags in the reactor containment building and auxiliary building

Radiation Worker Performance and Radiation Protection Technician Proficiency (IP Section 02.06) (1 Sample)

The inspectors evaluated radiation worker performance and radiation protection technician proficiency.

Radiological Hazard Assessment (IP Section 02.01) (1 Sample)

The inspectors evaluated radiological hazards assessments and controls. The inspectors reviewed the following:

Radiological surveys

(1) General containment
(2) Reactor cavity
(3) Reactor head
(4) Inside bioshield
(5) Incore tunnel

Risk significant radiological work activities

(1) Reactor head lift
(2) Refuel activities
(3) Reactor head stud replacement - stuck stud 2 and 18
(4) Cavity decontamination
(5) Radiography

Air sample survey records

(1) Reactor containment building entries: 29-MAR-19-200005,7,8; and 31-Mar-19-200004, 5, 8

(2) Reactor containment building outage dailies: 08-APR-19-200008,9,10; 09-APR-19-200012,13,14; and 10-APR-19-200004,5,6

(3) Reactor cavity: 08-APR-19-200023, 24; 08-APR-19-200025, 26; 09-APR-19-200003,5; 09-APR-19-200006,8; and 10-APR-19-200023, 24

(4) Reactor head stand O-ring cutout: 10-APR-19-200007,18

(5) Breach of Valve BGHV8149B: 10-APR-19-200029, 34

Radiological Hazards Control and Work Coverage (IP Section 02.04) (1 Sample)

The inspectors evaluated in-plant radiological conditions during facility walkdowns and observation of radiological work activities.

Radiological work package for areas with airborne radioactivity

(1) There were no radiation work permits with airborne radioactivity available for review during this inspection. The inspectors reviewed radiation work permits with the

highest potential for airborne radioactivity and the results for air samples taken during the inspection period.

71124.02 - Occupational ALARA Planning and Controls

Implementation of ALARA and Radiological Work Controls (IP Section 02.03) (1 Sample)

The inspectors reviewed ALARA practices and radiological work controls by reviewing the following activities:

(1) RWP 16003707510, EMV0161 radiography
(2) RWP R23HDSTUD18, remove stuck stud 18
(3) RWP R23STD18DECON, RF23 Cavity Decontamination

Radiation Worker Performance (IP Section 02.04) (1 Sample)

The inspectors evaluated radiation worker and radiation protection technician performance during general work in containment, decontamination of the vessel flange in preparation for the removal of stuck stud 2, and during the radiography of EMV0161 in the auxiliary building.

71124.05 - Radiation Monitoring Instrumentation

Calibration and Testing Program (IP Section 02.02) (1 Sample)

The inspectors evaluated the calibration and testing program implementation. The inspectors reviewed the following:

Alarm Setpoint and Calibration Method Check of Personnel Contamination Monitors, Portal Monitors and Small Article Monitors

(1) TM-4010-HP
(2) PM-4046-HP

Failure to Meet Calibration or Source Check Acceptance Criteria

(1) CRM-4190-HP

Walk Downs and Observations (IP Section 02.01) (1 Sample)

The inspectors evaluated radiation monitoring instrumentation during plant walkdowns. The inspectors reviewed the following:

Portable Survey Instruments

(1) CRM-4025-HP
(2) CRM-4087-HP
(3) CRM-4134-HP
(4) CRM-4023-HP
(5) CRM-4089-HP
(6) ION-4174-HP
(7) GMI-4178-HP

Source Check Demonstration

(1) ION-4172-HP
(2) CRM-4115-HP
(3) GMI-4178-HP

Area Radiation Monitors and Continuous Air Monitors

(1) 0-EG-RE-09
(2) 0-GT-RE-33
(3) 0-SD-RE-24
(4) 0-SD-RE-38
(5) CAM-4019-HP
(6) CAM-4020-HP

Personnel Contamination Monitors, Portal Monitors and Small Article Monitors

(1) TM-4010-HP
(2) PCM-4054-HP
(3) PM-4046-HP

71124.06 - Radioactive Gaseous and Liquid Effluent Treatment

Calibration and Testing Program (Process & Effluent Monitors) (IP Section 02.02) (1 Sample)

The inspectors reviewed the following gaseous and liquid effluent monitor instrument calibrations and tests:

(1) GH-RE-10 radwaste building unit vent functional test, June 13, 2019
(2) GT-RE-21A plant unit vent calibration, January 29, 2019
(3) GT-RE-21B plant unit vent calibration, August 23, 2018
(4) HB-RE-18 liquid radwaste discharge monitor calibration, August 21, 2018

Dose Calculations (IP Section 02.05) (1 Sample)

The inspectors reviewed the following liquid and gaseous discharge permits to evaluate public dose calculations:

(1) Batch liquid radioactive release permit numbers:
- RP09-2019-L0037;0
- RP09-2018-L0007;1
- RP09-2017-L0028;1

(2) Batch airborne radioactive release permits:
- RP11A-2019-G0013;1
- RP13-2018-G0002;56
- RP13-2017-G0006;52

The inspectors reviewed the following annual radiological effluent release reports:

(1) 2017 Annual Radiological Effluent Release Report
(2) 2018 Annual Radiological Effluent Release Report

The inspectors also reviewed the following abnormal gaseous or liquid tank discharges:

(1) None were available for review during this inspection

Instrumentation and Equipment (IP Section 02.04) (1 Sample)

The inspectors reviewed the following radioactive effluent discharge system surveillance test results:

(1) Auxiliary/fuel building emergency exhaust filter adsorber Unit B, in-place leak test
(2) Control room pressurization filter adsorber Unit B, in-place leak test
(3) Control room filter adsorber Unit A, in-place leak test

Sampling and Analysis (IP Section 02.03) (1 Sample)

The inspectors reviewed the following radioactive effluent sampling and analysis activities:

(1) None were available for review during this inspection

The inspectors reviewed the following effluent discharge:

(1) June 11, 2019, discharge monitor tank A discharge

Walk Downs and Observations (IP Section 02.01) (1 Sample)

The inspectors walked down the following gaseous and liquid radioactive effluent monitoring and filtered ventilation systems to assess the material condition and verify proper alignment according to plant design:

(1) Liquid radwaste treatment system
(2) Gaseous radwaste treatment system

71124.07 - Radiological Environmental Monitoring Program

Groundwater Protection Initiative (GPI) Implementation (IP Section 02.02) (1 Sample)

The inspectors evaluated the licensee's voluntary groundwater protection initiative through review of licensee documented leaks and spills since the last inspection, groundwater sampling results, and any changes to the licensee's groundwater sampling, ground water protection initiative, and spill and leak program and procedures. The inspectors reviewed and observed selected onsite groundwater locations as delineated in the licensee's program to ensure timely identification of inadvertent releases into the groundwater. The licensee had no entries of spills or leaks into their 10 CFR 50.75(g) records since the last inspection.

The licensee is continuing to monitor tritium through monitoring wells MW-31, MW-34, MW-36, MW-39, MW-47, MW-58, and MW-59. In 2017, the licensee identified a peak

concentration in monitoring well MW-31 of 1,688 picoCuries per liter (pCi/l) in January which decreased by the end of the year to 278 pCi/l. In 2018, monitoring well MW-58 peaked at 911 pCi/l in January and decreased to 516 pCi/l by October. The licensee reported their sampling results in each respective annual radiological environmental operating report. The licensee is continuing to monitor the tritium levels and the continued decrease through natural attenuation.

Site Inspection (IP Section 02.01) (1 Sample)

The inspectors evaluated the radiological environmental monitoring program implementation:

Walkdowns, Calibrations, and Maintenance Record Review

(1) Air sampling stations: A1, A7, A8, A9, A10, and A11

(2) Thermoluminescent dosimeter (TLD) locations: 03, 05, 06, 21, 22a, 44, 45, 46, 47, and 61

(3) Air sampler pump calibrations: LAS-4179, LAS-4182, and LAS-4201

(4) Meteorological tower instrument calibrations

Environmental Sample Collections and Preparation Observation

(1) Vegetation samples from three sample locations: V9, V11, and V16
(2) Surface water grab samples from S01 and S02 locations

Licensee Actions in Response to Missed Sample, Inoperable Sampler, Lost TLD or Anomalous Measurement

(1) Licensee instituted compensatory sampling for selected surface water sampling locations (S01 and S02) due to flooding conditions

(2) Licensee replaced older air sampling pumps with new F&J pumps

(3) Licensee converted air sample stations from a straight line sample port to an overhanging goose neck configuration

(4) Missed environmental samples were evaluated for nominal equipment failures, aged equipment issues, power source issues, and sample reliability. The licensee made repairs, replaced equipment, and adjusted sampling locations to fulfill the environmental sampling program requirements. All missed and anomalous results were reported in the annual radiological environmental operating report.

Sampling Program for the Potential of Licensed Material Entering Groundwater

(1) The inspectors reviewed data from and observed the following sampled groundwater wells: U1MW-31, U1MW-937D, U1MW-939R, U1MW-940, U1MW-941, and U1MW-GW

71124.08 - Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

Radioactive Material Storage (IP Section 02.01) (1 Sample)

The inspectors evaluated radioactive material storage in the follow areas:

(1) Low Level Drum Storage Area (55-gallon drums)
(2) Radwaste north yard
(3) Radwaste south yard

The inspectors performed a container check (e.g., swelling, leakage and deformation) on the following containers:

(1) 9563, sludge oil solidified waste
(2) 9673, solidified waste
(3) 9677, solidified waste
(4) 9687, solidified waste
(5) 9709, SLW sludge solidified waste
(6) 9710, oily waste
(7) 16145, SGBD resin

Radioactive Waste System Walkdown (IP Section 02.02) (1 Sample)

The inspectors evaluated the following radioactive waste processing systems [and processes] during plant walkdowns:

Liquid or Solid Radioactive Waste Processing Systems

(1) Self-engaging dewatering system

Radioactive Waste Resin and/or Sludge Discharges Processes

(1) Resin handling system for spent resin and charcoal

Shipment Preparation (IP Section 02.04) (1 Sample)

The inspectors evaluated [and observed] the following radioactive material shipment preparation processes:

(1) 19-021, UN2912, radioactive material, LSA-I, Class 7, resin, June 11, 2019

Shipping Records (IP Section 02.05) (1 Sample)

The inspectors evaluated the following non-excepted package shipment records:

(1) 17-010, UN3321, radioactive material, LSA-II, Class 7, drummed mechanical filters, June 22, 2017

(2) 17-012, UN3321, radioactive material, LSA-II, Class 7, dewatered resin, July 12, 2017

(3) 17-061, UN2912, radioactive material, LSA-I, Class 7, dry active waste CYC 21, November 17, 2017

(4) 18-001, UN3321, radioactive material, LSA-II, Class 7, dewatered resin and charcoal, January 12, 2018

(5) 18-010, UN2911, radioactive material, Excepted Package, Class 7, instruments, April 12, 2018

(6) 18-018, UN2911, radioactive material, Excepted Package, Class 7, instruments, September 20, 2018

(7) 18-036, UN2912, radioactive material, LSA-I, Class 7, dry active waste, December 26, 2018

(8) 19-005, UN3321, radioactive material, LSA-II, Class 7, resin and charcoal, March 19, 2019

Waste Characterization and Classification (IP Section 02.03) (1 Sample)

The inspectors evaluated the radioactive waste characterization and classification for the following waste streams:

(1) 14Aug17-200011GEL, FBG02A BTRS Resin 2017, August 1, 2017
(2) 17Aug17-200011FBGD, FBG02D BTRS Resin, August 17, 2017
(3) 09MAR200018 DAW1, DAW CYCLE 22, March 8, 2018
(4) 18APR18-200020 PV3/6, ALPS PV3/PV6 Resin, April 18, 2018
(5) 07May18-200011(PV1), ALPS PV-1 Charcoal 2019, May 1, 2018
(6) 16AUG18-200010(PV3), ALPS PV-3 Resin, August 15, 2018
(7) 18Jan19-200021(PV2), ALPS PV-2 Charcoal 2019, January 15, 2019

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

BI02: RCS Leak Rate Sample (IP Section 02.11) (1 Sample)

(1) April 1, 2018 through March 31, 2019

MS05: Safety System Functional Failures (SSFFs) Sample (IP Section 02.04) (1 Sample)

(1) April 1, 2018 through March 31, 2019

MS08: Heat Removal Systems (IP Section 02.07) (1 Sample)

(1) April 1, 2018 through March 31, 2019

OR01: Occupational Exposure Control Effectiveness Sample (IP Section 02.15) (1 Sample)

(1) October 1, 2018, through March 31, 2019

PR01: Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences (RETS/ODCM) Radiological Effluent Occurrences Sample. (IP Section 02.16) (1 Sample)

(1) October 1, 2018, through March 31, 2019

71152 - Problem Identification and Resolution

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) Instrument air pressure control valves on June 22, 2019

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

The inspectors reviewed the licensee's corrective action program for potential adverse trends in troubleshooting equipment issues when the cause of a deficiency is not immediately clear and for a trend in safety-related door issues on June 3, 2019.

71153 - Followup of Events and Notices of Enforcement Discretion

Event Followup (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated essential service water valve EHV0066 valve coupling failure and the licensee's response on April 12, 2019

Personnel Performance (IP Section 03.03) (2 Samples)

(1) The inspectors evaluated an automatic reactor trip and the licensee's performance on May 17, 2019

(2) The inspectors evaluated a manual turbine trip and the licensee's performance on May 18, 2019

INSPECTION RESULTS

Observation: Semi-Annual Trend Review	71152
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 for troubleshooting equipment issues when the cause of a deficiency is not immediately clear and for a trend in safety-related door issues. The following troubleshooting examples were reviewed by the inspectors for 2019 where the licensee was unable to positively identify the cause or correct the apparent condition: • Condition Report 201900105: The P-9 bistable light was found unexpectedly not lit during a routine control room walkdown. The licensee decided to make an unplanned entry into the reactor trip instrumentation technical specification based on the indication. The licensee determined there were no activities in progress that affected	

the indication, verified that that the P-9 bistable was in the correct state, and a lamp test confirmed the light bulb was functioning. The P-9 bistable light then spontaneously relit and the licensee exited Technical Specification 3.3.1. The licensee concluded that that the observed condition appeared to be an indication problem only but was unable to find a clear cause. The licensee later inspected and re-lamped indicator lights for this issue.

- Condition Report 201901077: Control rod H-8 dropped while operating control rod bank D. Extensive troubleshooting by the licensee could not determine a conclusive reason for the control rod drop. After performing an undetermined cause risk assessment per Procedure MDP-ZZ-TR001, "Planning and Execution of Formal Troubleshooting Activities," the licensee recovered the rod. The licensee discussed the condition with the vendor, reviewed industry operating experience, and later performed inspections of the control rod drive mechanism during the refueling outage. After eliminating other possible causes, the licensee concluded that the probable cause was crud in the latching mechanism.

- Condition Report 201903494: When the train B motor-driven auxiliary feedwater pump suction check valve failed its breakaway torque checks, the licensee decided to make an unplanned entry into the auxiliary feedwater system technical specification. The licensee conducted an inspection of the valve's internals which did not identify an obvious cause for the increased torque required to operate the check valve. The licensee later concluded the valve packing was the cause of the increased resistance. The licensee returned the check valve to service following an adjustment of the valve packing and a successful performance of the torque check. Although a clear cause was not identified, the licensee took steps to eliminate other possible causes and took corrective action to improve operating torque.

The inspectors noted that the for these three examples, the licensee conservatively declared the equipment inoperable and initiated timely actions to identify the cause of the condition. When the condition self-cleared or the cause could not be positively identified, the licensee ensured that they ruled out the known possible causes and took appropriate corrective actions to try to address the problem. The inspectors verified that all issues were addressed within the scope of the corrective action program and that the completed and planned corrective actions were appropriate to correct the identified causes. The inspectors did not identify any trends or concerns that might be indicative of a more significant safety issue for troubleshooting equipment issues when the cause of a deficiency is not immediately clear.

The inspectors also reviewed an apparent trend in problems with doors that were important to safety. After the NRC identified Green non-cited violation 05000483/2018002-02 (ADAMS ML 18221A398), an auxiliary building door that was blocked open during Mode ascension (NRC Event 54061), and damaged door seals identified by the NRC which were documented in Condition Report 201903536, the licensee wrote Condition Report 201904398 to evaluate 34 condition reports generated in 2019 for an adverse trend in door issues. The licensee recognized gaps in their staff's understanding of functions performed by doors, identifying degraded conditions (including during use), and timely resolution of the issues identified. The inspectors noted that condition reports were being appropriately generated for individual deficiencies but that programmatic issues remain to be addressed. The inspectors noted that many of the condition reports are the result of a concerted effort to identify door issues at a low threshold. The inspectors concluded that the licensee appropriately identified this trend in safety-related door issues and was acting to address the causes.

Overall, the inspectors concluded that the licensee demonstrated a low threshold for issue identification and documentation in the corrective action program. The licensee applied a risk-based approach to ensure corrective actions are completed commensurate with an issue's safety significance. The inspectors did not identify any additional trends or concerns that might be indicative of a more significant issue with safety-related doors.

EXIT MEETINGS AND DEBRIEFS

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

- On July 2, 2019, the inspectors presented the integrated inspection results to Mr. T. Herrmann, Site Vice President, and other members of the licensee staff.

- On April 12, 2019, the inspectors presented the occupational radiation safety inspection results to Mr. T. Herrmann, Site Vice President and other members of the licensee staff.

- On April 12, 2019, the inspectors presented the inservice inspection results to Mr. T. Herrmann, Site Vice President and other members of the licensee staff.

- On June 14, 2019, the inspectors presented the public radiation safety inspection results to Mr. B. Cox, Assistant 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	201104350, 201900304, 201903907, 201903907	
71111.01	Miscellaneous	ULDBD-GF-001	Miscellaneous Building HVAC	3
71111.01	Procedures	EDP-ZZ-01129	Callaway Plant Risk Assessment	50
71111.01	Procedures	ODP-ZZ-0016E	Operations Technician Watchstation Practices and Rounds	45
71111.01	Procedures	PDP-ZZ-00027	Summer Readiness Program	8
71111.04	Corrective Action Documents	Condition Reports	201702402, 201806793, 201807138	
71111.04	Procedures	OTN-EJ-00001	Residual Heat Removal System	28
71111.05Q	Miscellaneous	MP 16-0024	SGK05 Supplemental Fan System	8
71111.05Q	Miscellaneous	Various	Fire Pre-plan Manual	40
71111.05Q	Procedures	APA-ZZ-00703	Fire Protection Operability Criteria and Surveillance Requirements	30
71111.05Q	Procedures	APA-ZZ-00750	Hazard Barrier Program	44
71111.06	Miscellaneous	PM0900506	Walkdown of the RWST FDN and Valve House	
71111.06	Miscellaneous	PM1009292	Clean Debris from UHS Cooling Tower Fan Deck Drains	
71111.06	Procedures	ESP-ZZ-01013	Maintenance Rule Structures Inspection	8
71111.07A	Corrective Action Documents	Condition Reports	201902062, 201902231, 201902396, 201902456, 201902921	
71111.07A	Work Orders		16506165, 17513066	
71111.08P	Corrective Action Documents	Condition Reports	201800861, 201801218, 201804786, 201804794, 201804816, 201901976	
71111.08P	Corrective Action Documents Resulting from	Condition Reports	201902288	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Inspection			
71111.08P	Engineering Evaluations	Condition Reports	201800861-002, 201801218-001, 201801218-002	
71111.08P	Miscellaneous		Callaway Nuclear Plant Containment Exterior Concrete and Tendon Inspection Program	4
71111.08P	Miscellaneous		Callaway Nuclear Plant Containment Pressure Boundary ISI Program, ASME Section XI, Subsection IWE	4
71111.08P	Miscellaneous		Fourth Interval Inservice Inspection Program Plan, Fourth Interval Inservice Inspection Program Plan	0
71111.08P	Miscellaneous		Fourth Interval Inservice Inspection Program Plan	1
71111.08P	Miscellaneous		Fourth Interval Inservice Inspection Program Plan Appendix A, Code Cases and Requests for Relief/Alternative Applied to the Fourth Interval	0
71111.08P	Miscellaneous		Fourth Interval Inservice Inspection Program Plan Appendix A, Code Cases and Requests for Relief/Alternative Applied to the Fourth Interval	1 - Draft
71111.08P	Miscellaneous		NDE Personnel Qualifications for D. Davis and W. Thomas	
71111.08P	Miscellaneous		Welding Personnel Qualifications for A. Carroll, M. Collier, R. Holliday, A. Langkop, D. Leeper, J. Parker, N. Rosenquist, B. Thomas, A. Weisacosky, and C. Wood	
71111.08P	Miscellaneous	Relief Request I4R-02	Relief from the Requirements of the ASME Code, Section XI, Table IWF-2500-1 for 100 Percent Visual Examination of Class 1 Supports	
71111.08P	Miscellaneous	Relief Request I4R-04	Request for Alternative Applicable to the Fourth 10-Year Inspection Program Interval	
71111.08P	Miscellaneous	Specification C-1003(Q)	Inservice Inspection of the Containment Post-Tensioning System and Exterior Concrete Shell	13
71111.08P	NDE Reports	Job #13503632, Task 500	RPV Head Bare Metal Examination Summary, ASME Code Class 1	04/13/19
71111.08P	NDE Reports	Report 5010-19-0001	Pipe to flange weld (FW-01), Job # 17002729, Task 180, ASME Class 3	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.08P	NDE Reports	Report 5010-19-0008	Pipe to crossover tee weld (FW-17), Job # 17002729, Task 500, ASME Class 3	
71111.08P	NDE Reports	Report 5010-19-0009	Pipe to elbow weld (FW-21), Job # 17002729, Task 500, ASME Class 3	
71111.08P	NDE Reports	Report 5010-19-0012	Pipe to crossover tee weld (FW-10), Job # 17002729, Task 500, ASME Class 3	
71111.08P	NDE Reports	Report 5040-19-002	Fuel Transfer System Tube and Flange, Job # 17512708, Task 510, ASME Class IWE	
71111.08P	NDE Reports	Report: 19-000245	Component: 2-CH-STUD-02-R2, Component Description: RPV Stud #2 2nd Replacement, ASME Code Class 1	04/29/19
71111.08P	Procedures	APA-ZZ-00661	Administration of Welding	16
71111.08P	Procedures	APA-ZZ-00662	ASME Section XI Repair/Replacement Program	23
71111.08P	Procedures	EDP-ZZ-01003	Inservice Inspection Program	31
71111.08P	Procedures	EDP-ZZ-01004	Boric Acid Corrosion Control Program	22
71111.08P	Procedures	ESP-ZZ-01012	Containment Post-Tensioning System Inspection	9
71111.08P	Procedures	ESP-ZZ-01016	ASME Section XI IWE Containment Pressure Boundary Inspection	8
71111.08P	Procedures	LMT-08-PDI-UT-5	Straight Beam Ultrasonic Examination of Bolts and Studs	0
71111.08P	Procedures	MDP-ZZ-LM001	Fluid Leak Management Program	19
71111.08P	Procedures	MTW-ZZ-WP002	Welder Performance Qualification	27
71111.08P	Procedures	MTW-ZZ-WP003	Control of Welding Filler Materials	24
71111.08P	Procedures	MTW-ZZ-WP006	Qualification of Welding Procedures	9
71111.08P	Procedures	QCP-ZZ-05040	Visual Examination to ASME VT-1	23
71111.08P	Procedures	QCP-ZZ-05041	Visual Examination to ASME VT-2	30
71111.08P	Procedures	QCP-ZZ-05042	Visual Examination to ASME VT-3	21
71111.08P	Procedures	QCP-ZZ-05048	Boric Acid Walkdown for RCS Pressure Boundary	14
71111.08P	Procedures	QCP-ZZ-05049	RPV Head Bare Metal Examination	5
71111.08P	Self-Assessments	Self-Assessment 201309684-08	Material Degradation Management Plan	09/4/2014
71111.08P	Self-Assessments	Self-Assessment 201309684-31	ISI Program, dated 6/20/14	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.08P	Work Orders		17002729/180, 17002729/00, 17002729/40, 17992729/580	
71111.12	Corrective Action Documents	Condition Reports	201902794, 201901943, 201903344, 201903353, 201903360, 201903366, 201903372	
71111.12	Procedures	OTG-ZZ-00002	Reactor Startup – IPTE	61
71111.12	Procedures	OTG-ZZ-00003	Plant Startup Hot Zero Power to 30% Power	64
71111.12	Procedures	OTN-BB-00001	Reactor Coolant System – IPTE	50
71111.13	Procedures	ODMI 19-0002	Tuning Parameter Adjustments on Digital Controls Post Mod Testing	0
		OOA-ZZ-SSM01	Shutdown Safety Monitoring (SSM)	9
71111.15	Corrective Action Documents	Condition Reports	201806521, 201902462, 201904050	
71111.15	Procedures	EDP-ZZ-01114	Motor Operated Valve Program Guide	36
71111.15	Procedures	MTE-ZZ-QA006	Motor Operated Valve Analyst Guide	10
71111.15	Work Orders		19002798	
71111.19	Corrective Action Documents	Condition Reports	201805239, 201902591, 201902876, 201903026, 201903553	
71111.19	Procedures	OTN-MD-00001	Switchyard Breakers and Disconnects	30
71111.19	Work Orders		18000062, 18000065, 19001674	
71111.20	Corrective Action Documents	Condition Reports	201903004	
71111.20	Procedures	ITM-BB-L0053	BBLT0053A/B/BB Fill Vent and Calibration	1
71111.20	Procedures	OSP-BB-00007	RCS Heatup and Cooldown Limitations	14
71111.20	Procedures	OTA-RK-00018	Annunciator Response Procedure MCB Panel RK018	4
71111.22	Corrective Action Documents	Condition Reports	201902874, 201902927, 201903657, 201903953, 201904075, 201904191	
71111.22	Procedures	OSP-AL-P0002	Turbine Driven Aux Feedwater Pump Inservice Test – Group B	80
71111.22	Procedures	OSP-BB-00009	RCS Inventory Balance	38

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.22	Procedures	OSP-BB-V002A	PORV Inservice Test	14
71111.22	Work Orders		17001333, 17001334, 17003817, 17512419, 17512680, 17513093, 17514041, 17514487, 19507557, 19507663, 19507685, 19507835	
71124.01	Corrective Action Documents	Condition Reports	201900315, 201900883, 201900908, 201900930, 201901021, 201901659, 201901908, 201901995	
71124.01	Miscellaneous	Air Sample Log	Various Air Sample Logs	01/16/2019 – 04/10/2019
71124.01	Miscellaneous	PM1002835	Non-Special Nuclear Material RAM Stored in the Spent Fuel Pool	
71124.01	Miscellaneous	Source Leak Checks	Various Source Leak Checks	01/18/2017 - 01/25/2019
71124.01	Procedures	APA-ZZ-01000	Callaway Energy Center Radiation Protection Program	046
71124.01	Procedures	APA-ZZ-01000, Appendix A	Control of Radioactive Material	22
71124.01	Procedures	APA-ZZ-01004	Radiological Work Standards	31
71124.01	Procedures	HDP-ZZ-01200	Radiation Work Permits	33
71124.01	Procedures	HDP-ZZ-01500	Radiological Postings	48
71124.01	Procedures	HDP-ZZ-03000	Radiological Survey Program	47
71124.01	Procedures	HDP-ZZ-06000	Contamination Control and Alpha Monitoring Program	24
71124.01	Procedures	HSP-ZZ-00001	Radioactive Sealed Source Leak Check Surveillance	15
71124.01	Procedures	HTP-ZZ-01203	Radiological Area Access Control	57
71124.01	Procedures	HTP-ZZ-02005	Handling of Radioactive Material	49
71124.01	Procedures	HTP-ZZ-06001	High Radiation / Locked High Radiation / Very High Radiation Area Access	51
71124.01	Procedures	HTP-ZZ-06028	Radiological Controls for Pools that Contain or Store Spent Fuel	9
71124.01	Procedures	HTP-ZZ-06042	Industrial Radiography Using a Radioactive Source	14
71124.01	Radiation Surveys	CA-M-20190401-10	RB2000I Mode 3 Survey	04/10/2019
71124.01	Radiation	CA-M-20190402-24	R23 RB Lower Cavity Blind Flange Removal	04/02/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Surveys			
71124.01	Radiation Surveys	CA-M-20190402-31	RB2023I Regen HX Post Shielding Survey	04/02/2019
71124.01	Radiation Surveys	CA-M-20190404-31	RB2023I Scaffold Build to BG1E0126	04/04/2019
71124.01	Radiation Surveys	CA-M-20190406-09	RBHead - Reactor Head Lift	04/06/2019
71124.01	Radiation Surveys	CA-M-20190408-05	RB-2000-I G/A Five Days After CRUD Burst	04/08/2019
71124.01	Radiation Surveys	CA-M-20190408-25	Reactor Vessel Head (On Stand)	04/06/2019
71124.01	Radiation Surveys	CA-M-20190410-26	Gross Cavity Decon	04/10/2019
71124.01	Radiation Surveys	CA-M-20190410-27	Rx Shield Plate Install Post Survey	04/10/2019
71124.01	Radiation Work Permits (RWPs)	R23ENGHRA	RF23 Engineering Activities Inside High Radiation Areas in all RCA Areas Including the Reactor Building.	0
71124.01	Radiation Work Permits (RWPs)	R23FUEL	RF23 Offload Reactor, Perform FOSAR, Perform Reactor Reload, Core Mapping, Insert Shuffle, Pool Mapping, B5B Moves, and Miscellaneous Support Activities.	0
71124.01	Radiation Work Permits (RWPs)	R23HDDESSTUD	RF23 Install Stud Tensioner Hoists, Detension Reactor Vessel Studs, Remove Reactor Vessel Studs, Clean Stud Holes, Lubricate Stud Holes, Install Stud Hole Plugs, and Install Guides Studs/Pins.	0
71124.01	Radiation Work Permits (RWPs)	R23HDSTUD18	RF23 Activities to Remove Reactor Vessel Stuck Stud 18, Including Thread Repairs, and Inspect Its Stud Hole. Includes Cutting, Boring, QC/Engineering Inspections, and Associated Cavity Work (Except Cavity Decontamination).	0
71124.01	Radiation Work Permits (RWPs)	R23RCPCHANGE	RF23 Motor Change on A Reactor Coolant Pump and Associated Tasks.	0
71124.01	Radiation Work Permits (RWPs)	R23STD18DECON	RF23 Upper Cavity Gross Rinse, Vacuum of Seal Ring, Upper Cavity Decontamination, and RV Flange	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Cleaning to Support Removal of Stuck RV Stud #18. Includes all RP Coverage and Surveys.	
71124.01	Self-Assessments	AP18006	Nuclear Oversight Audit of Radiological and Non Radiological Environmental Monitoring Programs	06/13/2018
71124.02	Corrective Action Documents	Condition Reports	2018-02443, 2018-02930, 2018-02953, 2018-04531, 2018-04758, 2018-04903, 2018-05952, 2018-06019, 2018-06973, 2019-00904, 2019-00908, 2019-00998, 2019-01277, 2019-01355	
71124.02	Miscellaneous		RF23 Plant ALARA Review Committee (PARC) Meeting	01/24/2019
71124.02	Miscellaneous		RT Examination of 1" SCH 80 Pipe Weld in Room 113 of Aux Building Shot Plan	04/09/2019
71124.02	Miscellaneous		Powering into the Future - Callaway Refuel 23 Daily News Flyer	04/08/2019 - 04/11/2019
71124.02	Miscellaneous		Refuel 23 Outage Update & Shiftly SOM Turnover	04/08/2019 - 04/11/2019
71124.02	Miscellaneous		Callaway Radiation Protection Current Log	04/11/2019
71124.02	Miscellaneous	CA2943	Radiography Checklist - Radioactive Source	04/09/2019
71124.02	Miscellaneous	Reactor Vessel Stuck Stud Removal Project	01/31/2019	
71124.02	Procedures	APA-ZZ-01000	Callaway Energy Center Radiation Protection Program	45
71124.02	Procedures	APA-ZZ-01001	Callaway Plant ALARA Plant	27
71124.02	Procedures	APA-ZZ-01004	Radiological Work Standards	31
71124.02	Procedures	HDP-ZZ-01100	ALARA Planning and Review	24
71124.02	Procedures	HDP-ZZ-01200	Radiation Work Permits	33
71124.02	Procedures	HDP-ZZ-01500	Radiological Postings	48
71124.02	Procedures	HDP-ZZ-06000	Contamination Control and Alpha Monitoring Program	24
71124.02	Procedures	HTP-ZZ-01101	Administrative Controls for Radiation Shielding	26
71124.02	Procedures	HTP-ZZ-01104	Hot Spot Trending Program	6
71124.02	Procedures	HTP-ZZ-01203	Radiological Area Access Control	57
71124.02	Procedures	HTP-ZZ-06001	High Radiation/Locked High Radiation/Very High	51

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Radiation Area Access	
71124.02	Procedures	HTP-ZZ-06042	Industrial Radiography Using A Radioactive Source	14
71124.02	Radiation Surveys	CA-M-20190402-14	SJ Sample & Boronometer / PASS Rooms	04/02/2019
71124.02	Radiation Surveys	CA-M-20190402-17	Access Pit	04/02/2019
71124.02	Radiation Surveys	CA-M-20190405-23	RB-2090 RF Stud Rack Survey Update 18501154.500	04/05/2019
71124.02	Radiation Surveys	CA-M-20190405-31	RB2047 General Area - Routine Survey	04/05/2019
71124.02	Radiation Surveys	CA-M-20190405-33	RB2068 General Area Routine	04/05/2019
71124.02	Radiation Surveys	CA-M-20190408-19	Safety Injection Pump Room A	04/08/2019
71124.02	Radiation Surveys	CA-M-20190408-32	RB2026' General Area Routine	04/08/2019
71124.02	Radiation Surveys	CA-M-20190408-5	RB-2000-I G/A Five Days After CRUD Burst	04/08/2019
71124.02	Radiation Surveys	CA-M-20190410-26	Gross Cavity Decontamination	04/10/2019
71124.02	Radiation Surveys	CA-M-20190410-27	Rx Shield Plate Install Post Survey	04/10/2019
71124.02	Radiation Work Permits (RWPs)	16003707510	EMV0161 Radiography	0
71124.02	Radiation Work Permits (RWPs)	18500671139	RF23 Scaffold to BGV0449	0
71124.02	Radiation Work Permits (RWPs)	R23HDDESTUD	Detension Reactor Vessel Studs	0
71124.02	Radiation Work Permits (RWPs)	R23HDRESTUD	Install Reactor Vessel Studs	0
71124.02	Radiation Work Permits (RWPs)	R23HDSTUD18	Remove Stuck Stud 18	0
71124.02	Radiation Work Permits (RWPs)	R23STD18DECON	RF23 Cavity Decontamination	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71124.02	Self-Assessments	201820044-064	NRC Pre Inspection Self-Assessment: Rad Safety ALARA Planning and Occupational Dose Assessment	06/14/2018
71124.02	Self-Assessments	AP19001	Nuclear Oversight Audit of Radiation Protection	03/27/2019
71124.05	Calculations	HPCI-05-03	Evaluate Plant Radioactivity Mixture (Set Points)	2/22/2005
71124.05	Calculations	HPCI-1403	Use of PM-12 for Passive Monitoring	12/11/2018
71124.05	Calibration Records	16503276-500	SD-RE-024 Reactor Coolant Sample Room	3/16/2018
71124.05	Calibration Records	16513022-500	EG-RE-009 CCW HX A Inlet	5/7/2018
71124.05	Calibration Records	17504995-500	SD-RE-038 Spent Fuel Pool Area Rad High	10/22/2018
71124.05	Calibration Records	17506055-500	SD-RE-012 Aux Bldg. Corridor Basement Hi	6/11/2019
71124.05	Calibration Records	17506056-500	SD-RE-015 Aux Bldg. Corridor Basement Hi	6/11/2019
71124.05	Calibration Records	17508210-500	GT-RE-059 CTMT High Range (Electronics Calibration)	1/17/2019
71124.05	Calibration Records	17510146-500	GT-RE-033 CTMT Purge	2/8/2019
71124.05	Calibration Records	17512545-500	GT-RE-059 CTMT High Range (Isotopic Calibration)	4/10/2019
71124.05	Calibration Records	CAM-4019-HP	Calibration Certificate (PING-1A)	6/28/2018
71124.05	Calibration Records	CAM-4020-HP	Calibration Certificate (PING-1A)	2/27/2019
71124.05	Calibration Records	CAM-4045-HP	Calibration Certificate (Eberline AMS-4)	12/10/2018
71124.05	Calibration Records	CRM-4023-HP	Calibration Certificate (Ludlum Model 2000)	3/5/2019
71124.05	Calibration Records	CRM-4026-HP	Calibration Certificate (Ludlum Model 2000)	8/21/2018
71124.05	Calibration Records	CRM-4089-HP	Calibration Certificate (Ludlum Model 177)	1/26/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71124.05	Calibration Records	CRM-4134-HP	Calibration Certificate (Ludlum Model 177)	2/6/2019
71124.05	Calibration Records	GPC-4003-HP	Instrument Calibration / Verification (Tennelec)	11/4/2007
71124.05	Calibration Records	GSS-4220-HP	Instrument Calibration / Verification (Ortec - Detector 2)	3/21/2019
71124.05	Calibration Records	LAS-4198-HP	Calibration Certificate (Radeco Model HD-29A)	1/28/2019
71124.05	Calibration Records	LSC-4004-HP	Instrument Calibration / Verification (Perkin-Elmer)	4/25/2018
71124.05	Calibration Records	PCM-4054-HP	Calibration Certificate (PCM-12)	8/28/2018
71124.05	Calibration Records	PM-4046-HP	Calibration Certificate (PM-12)	8/28/2018
71124.05	Calibration Records	TM-4010-HP	Calibration Certificate (SAM-12)	3/31/2019
71124.05	Corrective Action Documents	Condition Reports	201703216, 201707720, 201800120, 201801122, 201805869, 201805975, 201900857, 201901599, 201902538, 201903111	
71124.05	Miscellaneous		Area Radiation Monitor Calibration Data	6/11/2019
71124.05	Miscellaneous		Calibration of Xradin Ion Chamber A3, A4, & A6	3/23/2018
71124.05	Procedures	APA-ZZ-00014	Conduct of Operations - Radiation Protection	25
71124.05	Procedures	HDP-ZZ-04000	Radiation Protection Instrumentation Program	29
71124.05	Procedures	HDP-ZZ-04700	Count Room and Whole Body Counter Quality Control Program	22
71124.05	Procedures	HSP-ZZ-00014	Rad Monitor Non-Functionality	26
71124.05	Procedures	HTP-SD-06033	Control of Area Radiation Monitor Alarm Setpoints	6
71124.05	Procedures	HTP-ZZ-04101-DTI-M177-Cal	Ludlum Model 177 Frisker Calibration	5
71124.05	Procedures	HTP-ZZ-04102-DTI-RO2-CAL	Eberline RO-2 Survey Meter Calibration	2
71124.05	Procedures	HTP-ZZ-04150	Operations of the GA Process Monitor System	54
71124.05	Procedures	HTP-ZZ-04167-DTI-Thermo-Radeye	Thermo RadEye Neutron Survey Meter Calibration	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		NL-Cal		
71124.05	Procedures	HTP-ZZ-04176-DTI-SAM12-Cal	Thermo Fisher Model SAM-12 Small Articles Monitor Calibration	5
71124.05	Procedures	HTP-ZZ-04178-DTI-Telepole-Cal	Rotem Telepole Survey Meter Calibration	10
71124.05	Procedures	HTP-ZZ-06020	Count Room Analytic and Quality Control Calculations and Methods	24
71124.05	Procedures	HTP-ZZ-07010	Alternate Method for Obtaining CHARMS Reading	8
71124.05	Procedures	ISL-GT-00R59	CTMT High Range Area Rad Monitor Loop Calibration	22
71124.05	Procedures	ITL-SD-00R00	Eberline Area Radiation Monitors	9
71124.05	Radiation Surveys	CA-M-20190327-19	NS-1 Neutron Source – Quarterly Routine	3/27/2019
71124.05	Self-Assessments	201807096-010/201900029-036	Instrument Program and Pre-NRC Inspection	3/28/2019
71124.05	Self-Assessments	AP19001	Nuclear Oversight Audit of Radiation Protection	3/27/2019
71124.06	Calculations	RP09-2017-L0028;1	Batch Liquid Radioactive Release Permit	07/28/2017
71124.06	Calculations	RP09-2018-L0007;1	Batch Liquid Radioactive Release Permit	02/01/2018
71124.06	Calculations	RP09-2019-L0037;0	Batch Liquid Radioactive Release Permit	06/11/2019
71124.06	Calculations	RP11A-2019-G0013;1	Batch Airborne Radioactive Release Permit	02/17/2019
71124.06	Calculations	RP13-2017-G0006;52	Continuous Airborne Radioactive Release Permit	12/07/2017
71124.06	Calculations	RP13-2018-G0002;56	Continuous Airborne Radioactive Release Permit	12/20/2018
71124.06	Calibration Records	Job 12504965.500	RW Bldg Disch Line Process Rad Mon Loop Cal	08/21/2018
71124.06	Calibration Records	Job 17502388.500	Ctmt Bld Air Exg Plenum (Unit Vent) Rad Xmt	08/23/2018

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71124.06	Corrective Action Documents	Condition Report	201703216, 201703232, 201703516, 201800052, 201800125, 201801122, 201801301, 201802268, 201802267, 201802407, 201802547, 201803062, 201803391, 201805008, 201805070, 201805144, 201805978, 201805987, 201805989, 201806167, 201900239, 201900348, 201900353, 201900438	
71124.06	Miscellaneous		Callaway Energy Center 2017 Annual Radioactive Effluent Release Report	
71124.06	Miscellaneous		Callaway Energy Center 2018 Draft Annual Radioactive Effluent Release Report	
71124.06	Miscellaneous	Job 15510527	FGG02A In-Place Bypass Leakage Test	03/10/2017
71124.06	Miscellaneous	Job 16509259	FGK02B In-Place Bypass Leakage Test	05/31/2018
71124.06	Miscellaneous	Job 17503239	FGE01 In-Place Bypass Leakage Test	07/16/2018
71124.06	Procedures	HSP-ZZ-00002	Radioactive Liquid Effluent Concentration	21
71124.06	Procedures	HSP-ZZ-00003	Dose Assessments from Liquid Effluents	11
71124.06	Procedures	HSP-ZZ-00004	Projected Dose from Liquid Waste	16
71124.06	Procedures	HTP-ZZ-02006	Liquid Radwaste Release Permit (Batch)	93
71124.06	Procedures	HTP-ZZ-02006	Liquid Radwaste Release Permit (Batch)	93
71124.06	Procedures	HTP-ZZ-02007	Gaseous Radwaste Release Permit (Gas Decay Tank)	48
71124.06	Procedures	HTP-ZZ-02008	Gaseous Radwaste Release Permit (Auxiliary/Fuel Building Ventilation)	30
71124.06	Procedures	HTP-ZZ-02009	Gaseous Radwaste Release Permit (Radwaste Building Ventilation)	29
71124.06	Procedures	HTP-ZZ-03006	Use of Airborne Sampling Cart	32
71124.06	Procedures	ISF-GH-0R10B	RW Building Exhaust Discharge Radiation Detector	32
71124.06	Self-Assessments		Nuclear Oversight Audit of Radiological and Non-Radiological Environmental Monitoring Programs, AP 18006	06/13/2018
71124.06	Self-Assessments		Nuclear Oversight Audit of Radiation Protection AP19001	03/27/2019
71124.07	Calculations	HPCI 1092	Evaluation of the 2018 Annual Land Use Census	1
71124.07	Calculations	HPCI 18-01	Evaluation of the 2017 Annual Land Use Census	0
71124.07	Calculations	HPCI-1503	Calculation of Long- Term Meteorological Dispersion	1

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Parameters	
71124.07	Calculations	HPCI-1506	Evaluation of Air Sampler Locations with Respect to the Recalculated Dispersion Parameters	1
71124.07	Calibration Records	Job 18504263	RD01-Primary Meteorological Tower Loop A	10/24/2018
71124.07	Calibration Records	Job 18504272	RD01-Primary Meteorological Tower Loop B	10/25/2018
71124.07	Calibration Records	Job 18511186	RD01-Primary Meteorological Tower Loop A	03/29/2019
71124.07	Calibration Records	Job 18511189	RD01-Primary Meteorological Tower Loop B	03/25/2019
71124.07	Calibration Records	LAS-4179	Low volume Air Sampler Serial Number 10216	11/09/18
71124.07	Calibration Records	LAS-4182	Low Volume Air Sampler Serial Number 8977	07/20/2018
71124.07	Calibration Records	LAS-4201	Low Volume Air Sampler Serial Number 8975	01/31/2019
71124.07	Corrective Action Documents	Condition Reports	201700071, 201700835, 201701864, 201702166, 201702981, 201703331, 201703581, 201705266, 201705398, 201705399, 201705403, 201705417, 201706786, 201706793, 201706794, 201801634, 201801736, 201801950, 201802361, 201803357, 201900612, 201900937, 201901217, 201902100	
71124.07	Corrective Action Documents Resulting from Inspection	Condition Reports	201904252	
71124.07	Miscellaneous		Environmental Dosimetry Company - Annual Quality Assurance Status Report: January - December 2017	03/07/2018
71124.07	Miscellaneous		Environmental Dosimetry Company - Annual Quality Assurance Status Report: January - December 2018	03/12/2019
71124.07	Miscellaneous	AP18006	Nuclear Oversight Audit of Radiological and Non Radiological Environmental Monitoring Programs	06/13/2018

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71124.07	Miscellaneous	AP19001	Nuclear Oversight Audit of Radiation Protection	03/27/2019
71124.07	Miscellaneous	APA-ZZ-01003	Off-Site Dose Calculation Manual	23
71124.07	Miscellaneous	AREOR	Annual Radiological Environmental Operating Report: January 1- December 31, 2017	
71124.07	Miscellaneous	AREOR	Annual Radiological Environmental Operating Report: January 1- December 31, 2018	
71124.07	Miscellaneous	NAQA-17-0038	Audit Report 17-007 for the Audit of Environmental Dosimetry Company	09/01/2017
71124.07	Procedures	HDP-ZZ-07000	Radiological Environmental Monitoring Program and Groundwater Protection Initiative	9
71124.07	Procedures	HTP-ZZ-04123-DTI-F&J-DF1T-CAL	F&J DF-1T Low Volume Air Sampler Calibration	8
71124.07	Procedures	HTP-ZZ-07001-DTI-Crop-Sampling	Collection and Shipping of Environmental Crop Samples	7
71124.07	Procedures	HTP-ZZ-07001-DTI-Water-Sampling	Collection and Shipping of Environmental Water Samples	11
71124.07	Procedures	HTP-ZZ-07101-DTI-REMP-SMPL-SCHED	REMP Sample Locations and Analysis Schedule	32
71124.07	Procedures	HTP-ZZ-07103-RP-DTI-REMP-DATAEVAL	Evaluation and Reporting of REMP Data	2
71124.07	Procedures	ISL-RD-RD01A	Meteorological Monitoring Instruments - Elevator A Loop Calibration	15
71124.07	Procedures	ISL-RD-RD01B	Meteorological Monitoring Instruments - Elevator B Loop Calibration	10
71124.07	Procedures	RP-DTI-ENVIRON-TLD LOCATIONS	Environmental TLD Locations	5
71124.07	Procedures	RP-DTI-ENVIRONMENTAL-SPILLRESP	Response to Spills or Leaks of Radioactive Material into Groundwater	10
71124.08	Corrective Action Documents	Condition Report	201701008, 201702081, 201704005, 201706627, 201804430, 201804447, 201806969, 201900861, 201900930, 201901038, 201902796, 201904190	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71124.08	Miscellaneous		Callaway Final Safety Analysis Report (FSAR) – Chapter 11.4	06/01/2018
71124.08	Miscellaneous		2018 RAM and Radwaste Shipping Log	2018
71124.08	Miscellaneous		Callaway Energy Center 2018 Annual Radioactive Effluent Release Report	2018
71124.08	Miscellaneous		Callaway Energy Center 2017 Annual Radioactive Effluent Release Report	2017
71124.08	Miscellaneous		2017 RAM and Radwaste Shipping Log	2017
71124.08	Procedures	APA-ZZ-01011	Process Control Program	14
71124.08	Procedures	HTP-HC-09002	10 CFR 61 Sampling Program	4
71124.08	Procedures	HTP-ZZ-02005	Handling of Radioactive Material	49
71124.08	Procedures	HTP-ZZ-09003	Shipment of Radioactive Wastes	6
71124.08	Procedures	RDP-ZZ-00200	Radwaste Operational Guidelines	21
71124.08	Procedures	RTN-HC-01900	On-Site Storage Container Handling Procedure	6
71124.08	Procedures	RTS-HC-00310	Primary Resin Sluice To Bulk Waste Disposal Station	47
71124.08	Procedures	RTS-HC-00350	Primary Spent Resin Storage Tank Transfer To Bulk Waste Disposal Station	14
71124.08	Procedures	RTS-ZZ-CH040	Handling of Transport Cask Model 14-215H	12
71124.08	Procedures	RTS-ZZ-CH050	Handling Procedure for CNS 8-120A Transport Cask	5
71124.08	Radiation Surveys	CA-M-20190409-24	RWY-4 & RWY-3 Radwaste Yard Plant (North & South)	04/09/2019
71124.08	Radiation Surveys	CA-M-20190415-05	7228 Drywaste Compactor Area - Quarterly Routine	04/14/2019
71124.08	Radiation Surveys	CA-M-20190421-24	7225 Quarterly Routine Survey - Low Level Drum Storage Area	04/21/2019
71124.08	Radiation Surveys	CA-M-20190524-02	RSS-1 Characterization - Resin Liner #PO661751-16	05/24/2019
71124.08	Self-Assessments		EPRI Solid Radioactive Waste Program Assessment at Ameren Callaway Nuclear Power Plant	07/14/2017
71124.08	Self-Assessments	201900029-035	Simple Self-Assessment: Shipping Program	05/02/2019
71124.08	Self-Assessments	AP19001	Ameren Nuclear Oversight Audit of Radiation Protection	03/27/2019
71124.08	Shipping	17-010	UN3321, RAM, LSA-11, Class 7 (Drummed	06/22/2017

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Records		Mechanical Filters)	
71124.08	Shipping Records	17-012	UN3321, RAM, LSA-II, Class 7 (Dewatered Resin)	07/12/2017
71124.08	Shipping Records	17-061	UN2912, RAM, LSA-I, Class 7 (Dry Active Waste Cycle 21)	11/17/2017
71124.08	Shipping Records	18-001	UN3321, RAM, LSA-II, Class 7 (Dewatered Resin and Charcoal)	01/12/2018
71124.08	Shipping Records	18-010	UN2911, RAM, Excepted Package, Class 7 (Instruments)	04/12/2018
71124.08	Shipping Records	18-018	UN2911, RAM, Excepted Package, Class 7 (Instruments)	09/20/2018
71124.08	Shipping Records	18-036	UN2912, RAM, LSA-I, Class 7 (Dry Active Waste)	12/26/2018
71124.08	Shipping Records	19-005	UN3321, RAM, LSA-II, Class 7 (Resin and Charcoal)	03/19/2019
71124.08	Shipping Records	19-021	UN2912, RAM, LSA-I, Class 7 (Resin)	06/11/2019
71153	Corrective Action Documents	Condition Reports	201901943, 201903787, 201903832	

The following items are requested for the Occupational Radiation Safety Inspection at Callaway

Dates of Inspection: 04/08/2019 to 04/12/2019

Integrated Report 2019002

Inspection areas are listed in the attachments below.

Please provide the requested information on or before **Monday, March 25, 2019**.

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.0**1** should be in a file/folder titled "**1**-A," applicable organization charts in file/folder "**1**-B," etc.

The information should be provided in electronic format or a secure document management service. If information is placed on *ims.certrec.com*, please ensure the inspection exit date entered is at least 30 days later than the onsite inspection dates, so the inspectors will have access to the information while writing the report.
In addition to the corrective action document lists provided for each inspection procedure listed below, please provide updated lists of corrective action documents at the entrance meeting. The dates for these lists should range from the end dates of the original lists to the day of the entrance meeting.

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

If you have any questions or comments, please contact Natasha Greene at 817-200-1154 or via e-mail at Natasha.Greene@nrc.gov.

PAPERWORK REDUCTION ACT STATEMENT

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

1. Radiological Hazard Assessment and Exposure Controls (71124.01) and Performance Indicator Verification (71151)

Date of Last Inspection: **November 5, 2018**

A. List of contacts and telephone numbers for the Radiation Protection Organization Staff and Technicians, as well as the Licensing/Regulatory Affairs staff. Please include area code and prefix. If work cell numbers are appropriate, then please include them as well.

B. Applicable organization charts including position or job titles. Please include as appropriate for your site, Site Management, RP, Chemistry, Maintenance (I&C), Engineering, and Emergency Protection. (Recent pictures are appreciated.)

C. Copies of audits, self-assessments, LARs, and LERs written since the last inspection date, related to this inspection area

D. Procedure indexes for the radiation protection procedures and other related disciplines.

E. Please provide procedures related to the following areas noted below. Additional procedures may be requested by number after the inspector reviews the procedure indexes.

1. Radiation Protection Program
2. Radiation Protection Conduct of Operations, if not included in #1.
3. Personnel Dosimetry
4. Posting of Radiological Areas
5. High Radiation Area Controls
6. RCA Access Controls and Radiation Worker Instructions
7. Conduct of Radiological Surveys
8. Radioactive Source Inventory and Control
9. Fuel Pool Inventory Access and Control

F. Please provide a list of NRC Regulatory Guides and NUREGs that you are currently committed to relative to this program. Please include the revision and/or date for the commitment and where this may be located in your current licensing basis documents.

G. Please provide a summary list of corrective action documents (including corporate and sub-tiered systems) since the last inspection date.

1. Initiated by the radiation protection organization
2. Assigned to the radiation protection organization

NOTE: These lists should include a description of the condition that provides sufficient detail that the inspectors can ascertain the regulatory impact, the <u>significance level</u> assigned to the condition, the status of the action (e.g., open, working, closed, etc.) and the <u>search criteria</u> used. Please provide in document formats which are “sortable” and “searchable” so that inspectors can quickly and efficiently determine appropriate sampling and perform word searches, as needed. (Excel spreadsheets are the preferred format.) If codes are used, please provide a legend for each column where a code is used.

H. List of radiologically significant work activities scheduled to be conducted during the inspection period. (If the inspection is scheduled during an outage, please also include a list of work activities greater than 1 rem, scheduled during the outage with the dose

estimate for the work activity.) Please include the radiological risk assigned to each activity.

I. Provide a summary of any changes to plant operation that have resulted or could result in a significant new radiological hazard. For each change, please provide the assessment conducted on the potential impact and any monitoring done to evaluate it.

J. List of active radiation work permits and those specifically planned for the on-site inspection week.

K. Please provide a list of air samples taken to verify engineering controls and a separate list for breathing air samples in airborne radiation areas or high contamination work areas. Please include the RWP the breathing air sampling supports.

L. Please provide the current radioactive source inventory, listing all radioactive sources that are required to be leak tested. Indicate which sources are deemed 10 CFR Part 20, Appendix E, Category 1 or Category 2. Please indicate the radioisotope, initial and current activity (w/assay date), and storage location for each applicable source.

M. The last two leak test results for all required/applicable radioactive sources that have failed its leak test within the last two years. Provide any applicable condition reports.

N. A list of all non-fuel items stored in the spent fuel pools, and if available, their appropriate dose rates (Contact / @ 30cm)

O. A list of radiological controlled area entries greater than 100 millirem, since the last inspection date. The list should include the date of entry, some form of worker identification, the radiation work permit used by the worker, dose accrued by the worker, and the electronic dosimeter dose alarm set-point used during the entry (for Occupational Radiation Safety Performance Indicator verification in accordance with IP 71151).

P. A list describing VHRAs and TS HRAs (> 1 rem/hour) that are current and historical. Include their current status, locations, and control measures.

Q. Temporary effluent monitor locations and calibrations (AMS-4) used to monitor normally closed doors or off-normal release points (e.g., equipment hatch or turbine heater bay doors). Include any CRs associated with this monitoring or instrumentation.

2. Occupational ALARA Planning and Controls (71124.02)

Date of Last Inspection: **May 21, 2018**

A. List of contacts and telephone numbers for ALARA program personnel, as well as the Licensing/Regulatory Affairs staff. Please include area code and prefix. If work cell numbers are appropriate, then please include them as well.

B. Applicable organization charts including position or job titles. Please include as appropriate for your site, Site Management, RP, Chemistry, Maintenance (I&C), Engineering, and Emergency Protection. (Recent pictures are appreciated.)

C. Copies of audits, self-assessments, LARs, and LERs, written since the date of last inspection, focusing on ALARA

D. Procedure index for ALARA Program procedures and other related disciplines.

E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures may be requested by number after the inspector reviews the procedure indexes.
   1. ALARA Program
   2. ALARA Planning
   3. ALARA Reviews
   4. ALARA Committee
   5. Radiation Work Permit Preparation

F. Please provide a list of NRC Regulatory Guides and NUREGs that you are currently committed to relative to this program. Please include the revision and/or date for the commitment and where this may be located in your current licensing basis documents.

G. Please provide a summary list of corrective action documents (including corporate and sub-tiered systems) written since the date of last inspection, related to the ALARA program, including exceeding RWP Dose Estimates.

   NOTE: These lists should include a description of the condition that provides sufficient detail that the inspectors can ascertain the regulatory impact, the significance level assigned to the condition, the status of the action (e.g., open, working, closed, etc.) and the search criteria used. Please provide in document formats which are "sortable" and "searchable" so that inspectors can quickly and efficiently determine appropriate sampling and perform word searches, as needed. (Excel spreadsheets are the preferred format.) If codes are used, please provide a legend for each column where a code is used.

H. List of work activities (RWPs) greater than 1 rem, since date of last inspection, including the original dose estimates and actual doses accrued. (Excel format preferred). Please provide all revisions/changes, as well as any related RWPs that support the work activity.

I. List of active work activities (RWPs) that will be in use while we are onsite, including the dose and dose rate settings, and if available, the planned dose. Include planning documents and surveys. Include radiological risk assessments and proposed control measures.

J. Site dose totals for the past 3 years (based on dose of record). Also provide the current year-to-date (YTD) collective radiation exposure (CRE). In addition, please provide another document that separates the online and outage doses for the past 3 years.

K. Most recent assessment of your isotopic mix, including the hard-to-detect radionuclides and alpha hazards. Include a list of new and historical exposure issues (radiological source term or high exposure areas/activities).

L. If available, provide a copy of the lessons learned from the most recently completed outage for each unit. Include a summary list of any associated corrective action documents and the current status of any corrective actions assigned.

M. Please provide the methods/reports that are in your process to meet the requirements of 10 CFR 20.1101(c) for periodic review of your RP program.

N. Current exposure trends (BRAC dose rates and/or source term information).

The following items are requested for the
Public Radiation Safety Inspection
at Callaway

Dates of Inspection: 06/10/2019 to 06/14/2019

Integrated Report 2019002

Inspection areas are listed in the attachments below.

Please provide the requested information on or before **Friday, May 24, 2019**.

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.0**5** should be in a file/folder titled "**5**-A," applicable organization charts in file/folder "**5**-B," etc.

The information should be provided in electronic format or a secure document management service. If information is placed on *a secured document management system*, please ensure the inspection exit date entered is at least 30 days later than the onsite inspection dates, so the inspectors will have access to the information while writing the report.
In addition to the corrective action document lists provided for each inspection procedure listed below, please provide updated lists of corrective action documents at the entrance meeting. The dates for these lists should range from the end dates of the original lists to the day of the entrance meeting.

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

If you have any questions or comments, please contact Natasha Greene at 817-200-1154 or via e-mail at Natasha.Greene@nrc.gov.

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

5. Radiation Monitoring Instrumentation (71124.05)

Date of Last Inspection: **February 27, 2017**

A. List of contacts and telephone numbers for the following areas below. Please include area code and prefix. If work cell numbers are appropriate, then please include them as well.

1. Process monitor calibration (Include Chemistry, Systems Engineering and I&C, as applicable)
2. Radiation protection instrument calibration (Portable and Stationary)
3. Installed instrument calibrations (Include Systems Engineering and I&C)
4. Count room and Laboratory instrument calibrations (Include RP and Chemistry, as applicable)
5. EP contacts for Equipment Important to Emergency Response/Preparedness (EITER)
6. Licensing/Regulatory Affairs

B. Applicable organization charts, including position or job titles. Please include as appropriate for your site, Site Management, RP, Chemistry, Maintenance (I&C), Engineering, and Emergency Protection. (Recent pictures are appreciated.)

C. Copies of audits, self-assessments, vendor or NUPIC audits for contractor support, LARs, and LERs, performed since the date of the last inspection, related to:

1. Portable Radiation instruments: Area radiation monitors, portable continuous air monitors (AMS3/4), portable survey instruments (count rate, dose rate, occupational air sampling), electronic dosimeters, teledosimetry
2. Stationary Radiation Instruments: Portal monitors, small article monitors, personnel contamination monitors, or whole body counters
3. Installed Radiation Instruments: Area radiation monitors (RMS), process monitors (non-effluent), criticality monitors, accident monitors
4. Count Room instrumentation (Chemistry and RP, if separate RP Ops and Effluents): Gamma Spec, LSC, Gross Alpha, Gross Beta, including bench-top counters

D. Procedure indexes for radiation protection procedures and other related disciplines.

1. Calibration, use, and operation of continuous air monitors, portable survey instruments, temporary area radiation monitors, electronic dosimeters, teledosimetry
2. Calibration use and operation of portal monitors, small article monitors, personnel contamination monitors, and whole body counters
3. Calibration of installed area radiation monitors, process monitors, criticality monitors, and accident monitors
4. Calibration use and operation of Count Room instrumentation (GS, LSC, GA, GB) (include bench top counters here)

NOTE: Please ensure that RP, Chemistry, and I&C procedures are included, as appropriate.

E. Please provide specific procedures related to the following areas noted below. Additional procedures may be requested by number after the inspector reviews the

procedure index.

1. Calibration of portable ion chambers
2. Calibration of Friskers
3. Calibration of telescoping high range instruments
4. Calibration of portable neutron instruments
5. Calibration of SAMs
6. Whole body counter calibration
7. Laboratory instrumentation quality control
8. Calibration of Containment/Drywell high range radiation monitor

F. Please provide a list of NRC Regulatory Guides and NUREGs that you are currently committed to relative to this program. Please include the revision and/or date for the commitment and where this may be located in your current licensing basis documents.

G. Please provide a summary list of corrective action documents (including corporate and sub-tiered systems) written since the date of the last inspection, related to the following programs:

1. Area radiation monitors, continuous air monitors, portable survey instruments, electronic dosimeters, and teledosimetry
2. Portal monitors, small article monitors, personnel contamination monitors, and whole body counters
3. Installed radiation monitors, criticality monitors, accident range monitors
4. Count room radiation instruments

NOTE: These lists should include a description of the condition that provides sufficient detail that the inspectors can ascertain the regulatory impact, the significance level assigned to the condition, the status of the action (e.g., open, working, closed, etc.) and the search criteria used. Please provide in document formats which are “sortable” and “searchable” so that inspectors can quickly and efficiently determine appropriate sampling and perform word searches, as needed. (Excel spreadsheets are the preferred format.) If codes are used, please provide a legend for each column where a code is used.

H. State the required calibration frequency and provide the most recent calibration data for the whole body counters, at least one portable survey instrument, one area radiation monitor, one air sampler, one continuous air monitor, and one drywell/containment high-range monitor.

I. Provide a list of any scheduled calibrations, while we are onsite, for the instrumentation noted in request above, in 5-I.

J. Provide the alarm set point values for the portal and personnel contamination monitors in operation.

K. Radiation Monitoring System health report for the previous 12 months

L. Provide the following lists of instruments to include make, model, identifier (S/N or plant ID), and location:

1. Portable radiation instruments currently in use (for EADs just make, model, and quantity).

2. Stationary radiation instruments currently in use.
3. Installed Radiation monitors
    a. Area radiation monitors and
    b. Process radiation monitors.
    (Include their instrumentation designator, function and calibration procedure number and title.) Please indicate which, if any, detectors have been replaced within the past 2 years (since the last inspection).
    c. Radiation instrumentation abandoned in place.
    d. Radiation instrumentation covered by the maintenance rule.

M. Provide a list of sources used routinely for source check of portable, stationary, and installed radiation monitoring instruments.

N. Provide the NIST traceability and calibration or verification of the primary sources for instrument calibration and the procedures used to achieve this.

6. Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

Date of Last Inspection: **February 27, 2017**

A. List of contacts and telephone numbers for the following areas. Please include area code and prefix. If work cell numbers are appropriate, then please include them as well.

1. Radiological effluent control (liquid & gaseous) and reporting (RP, Chemistry, RW, Ops, etc.)
2. Effluent Monitor calibration (liquid and gaseous) and maintenance (RP, Chemistry, I&C, Maintenance, Systems Engineering, EP, etc.)
3. Engineered safety feature air cleaning systems for effluent release (Systems Engineering, I&C, Maintenance, etc.)
4. Licensing/Regulatory Affairs

B. Applicable organization charts including position or job titles for the above individuals and also for their supportive Management. Please include as appropriate for your site, Site Management, RP, Chemistry, Maintenance (I&C), Engineering, and Emergency Protection. (Recent pictures are appreciated.)

C. Copies of audits, self-assessments, vendor or NUPIC audits of contractor support, and LERs written since the date of the last inspection, related to:

1. Radioactive effluents and effluent radiation monitors
2. Engineered Safety Feature Air cleaning systems

D. Procedure indexes for the following areas and related disciplines.

1. Radioactive effluents and effluent radiation monitors (to include the flow monitors)
2. Engineered Safety Feature Air cleaning systems (both TS and non-TS systems for effluents)

E. Please provide specific procedures related to the following areas noted below. Additional procedures may be requested by number after the inspector reviews the procedure indexes.

1. Sampling and analysis of radioactive effluents
2. Effluent monitor setpoint determination
3. Generating radioactive effluent release permits
4. Effluent Monitor Calibrations (Include associated flow monitors)
5. Laboratory instrumentation quality control
6. In-place testing of HEPA filters and charcoal adsorbers for TS effluent exhaust systems and other effluent air-cleaning systems, but not breathing air systems

F. Please provide a list of NRC Regulatory Guides and NUREGs that you are currently committed to relative to this program. Please include the revision and/or date for the commitment and where this may be located in your current licensing basis documents.

G. Please provide a summary list of corrective action documents (including corporate and sub-tiered systems) written since the date of the last inspection, associated with:

1. Radioactive effluents
2. Effluent radiation monitors (include associated effluent flow monitors)
3. Engineered Safety Feature Air cleaning systems (effluents, not breathing air)

NOTE: These lists should include a description of the condition that provides sufficient detail that the inspectors can ascertain the regulatory impact, the significance level assigned to the condition, the status of the action (e.g., open, working, closed, etc.) and the search criteria used. Please provide in document formats which are “sortable” and “searchable” so that inspectors can quickly and efficiently determine appropriate sampling and perform word searches, as needed. (Excel spreadsheets are the preferred format.) If codes are used, please provide a legend for each column where a code is used.

H. Annual Radioactive Effluent Release Reports for the latest two calendar years

I. Current revision of the Offsite Dose Calculation Manual (or other name, but include all parts for effluents) and any changes made since the last inspection.

J. The inter-laboratory comparison results for laboratory quality control performance of effluent sample analysis for the latest two calendar years

K. Effluent sampling schedule for the week of the inspection

L. Provide the last three annual trends of vent/stack effluent flow rates, by chart or table.

M. Operations department (or other responsible dept.) log records for effluent monitors removed from service or out of service or a list of the same and compensatory actions taken during the out of service condition.

N. Listing or log of liquid and gaseous release permits since the date of the last inspection

O. A list of the technical specification-required air cleaning systems with the two most recent surveillance test dates of in-place filter testing (of HEPA filters and charcoal adsorbers) and laboratory testing (of charcoal efficiency) and the work order numbers associated with the surveillances (and their system number/name).

P. System Health Report for radiation monitoring instrumentation. Also, please provide a specific list of all effluent radiation monitors that were considered inoperable for 7 days or more since the date of the last inspection. If applicable, please provide the relative Special Report and condition report(s). If not covered by maintenance rule, please provide rationale.

Q. A list of significant changes made to the gaseous and liquid effluent process monitoring system since the date of the last inspection. If applicable, please provide the corresponding UFSAR section in which this change was documented.

R. A list of any occurrence in which a non-radioactive system was contaminated by a radioactive system since the date of the last inspection. Please include any relevant condition report(s).

S. Current Part 61 analyses for hard to detect radionuclides

T. Latest Land Use Census (coordinate with 71124.07)

U. Effluent based procedures for EALs or EOPs.

7. Radiological Environmental Monitoring Program (71124.07)

Date of Last Inspection: **February 27, 2017**

A. List of contacts and telephone numbers for the following areas. Please include area code and prefix. If work cell numbers are appropriate, then please include them as well.

1. Radiological environmental monitoring (RP, Chemistry, I&C, etc.)
2. Meteorological monitoring (RP, Chemistry, EP, I&C, System Engineering, etc.)
3. Maintenance and calibration of the above equipment
4. Licensing/Regulatory Affairs

B. Applicable organization charts including position or job titles. Please include as appropriate for your site, Site Management, RP, Chemistry, Maintenance (I&C), Engineering, and Emergency Protection. (Recent pictures are appreciated.)

C. Copies of audits, self-assessments, vendor or NUPIC audits of contractor support, and LERs written since the date of the last inspection, related to:

1. Radiological environmental monitoring program (including contractor environmental laboratory audits, if used to perform environmental program functions)
2. Environmental TLD processing facility
3. Meteorological monitoring program

D. Procedure index for the following areas and other related disciplines.

1. Radiological environmental monitoring program
2. Meteorological monitoring program
3. Maintenance and calibration of related instrumentation, including the meteorological tower

E. Please provide specific procedures related to the following areas noted below. Additional procedures may be requested by number after the inspector reviews the procedure indexes.

1. Sampling, collection and preparation of environmental samples
2. Sample analysis (if performed onsite)
3. Laboratory instrumentation quality control
4. Meteorological Tower sensor calibrations

F. Please provide a list of NRC Regulatory Guides and NUREGs that you are currently committed to relative to this program. Please include the revision and/or date for the commitment and where this may be located in your current licensing basis documents.

G. Please provide a summary list of corrective action documents (including corporate and sub-tiered systems) written since the date of the last inspection, related to the following programs:

1. Radiological environmental monitoring (include TLDs and air sample pumps or their infrastructure)
2. Meteorological monitoring (include Met Tower sensors and support equipment)

These lists should include a description of the condition that provides sufficient detail that the inspectors can ascertain the regulatory impact, the significance level assigned to the condition, the status of the action (e.g., open, working, closed, etc.) and the search criteria used. Please provide in document formats which are “sortable” and “searchable” so that inspectors can quickly and efficiently determine appropriate sampling and perform word searches, as needed. (Excel spreadsheets are the preferred format.) If codes are used, please provide a legend for each column where a code is used.

H. Copies of the two most recent calibration packages for the meteorological tower instruments

I. Copies of the Annual Radiological Environmental Operating Reports and Land Use Census for the latest two calendar years, and current revision of the Offsite Dose Calculation Manual. Please include any supportive documentation for the changes made to the ODCM since the last inspection.

J. Copy of the environmental laboratory’s inter-laboratory comparison program results for the latest two calendar years, if not included in the Annual Radiological Environmental Operating Report

K. Data from the environmental laboratory documenting the analytical detection sensitivities for the various environmental sample media (i.e., air, water, soil, vegetation, and milk)

L. Quality Assurance audits (e.g., NUPIC) for contracted services

M. Current NEI Groundwater Protection Initiative (GPI) Plan and status. Provide the most recent monitoring results for each monitoring well per the GPI. Provide a separate list of any missed samples, as applicable.

N. Technical requirements manual or licensee controlled specifications which list the meteorological instruments' calibration requirements

O. If applicable, per NEI 07-07, provide any reports that document any spills/leaks to groundwater since the date of the last inspection. Please indicate what external communications were made regarding each spill/leak.

P. Provide any new entries into 10 CFR 50.75(g) files since the date of the last inspection.

Q. Please identify your three *highest* X/Q (chi/Q) and/or D/Q sectors, as currently used in the selection of your required REMP sampling locations. If these are *different* values from your most recent meteorological assessment, please provide that assessment and indicate the three *highest* X/Q and/or D/Q sectors per your latest assessment. Also indicate your noted *predominant* and *least prevalent* wind direction/sector, as used in your REMP analysis.

R. Provide the height of the highest effluent release point. Please indicate if the height accounts for plant grade elevation. Please also provide the *most probable* atmospheric release height, <u>if different</u> from the highest effluent release point.

S. Please provide a schedule of any planned REMP sampling activities while we, the NRC, are scheduled to be onsite performing this inspection.

8. Radioactive Solid Waste Processing, and Radioactive Material Handling, Storage, and Transportation (71124.08)

Date of Last Inspection: **February 27, 2017**

A. List of contacts and telephone numbers for the following areas. Please include area code and prefix. If work cell numbers are appropriate, then please include them as well.

1. Solid Radioactive waste processing (RP, Chemistry, Ops, Maintenance, I&C, Engineering, etc.)
2. Transportation of radioactive material/waste (RP, Maintenance, Ops, Security, Chemistry, etc.)
3. personnel involved in solid radwaste processing, transferring, and transportation of radioactive waste/materials)
4. Licensing/Regulatory Affairs

B. Applicable organization charts including position or job titles. Please include as appropriate for your site, Site Management, RP, Chemistry, Maintenance (I&C), Engineering, and Emergency Protection. (Recent pictures are appreciated.)

C. Copies of audits, department self-assessments, and LERs written since the date of the last inspection, related to:

1. Solid radioactive waste management
2. Radioactive material/waste transportation program

D. Procedure index for the following areas and other related disciplines.

1. Solid radioactive waste management

2. Radioactive material/waste transportation

E. Please provide specific procedures related to the following areas noted below. Additional procedures may be requested by number after the inspector reviews the procedure indexes.

1. Process control program and any changes made since the last inspection
2. Solid and liquid radioactive waste processing
3. Waste stream sampling and analysis
4. Waste characterization and classification
5. Radioactive material/waste packaging & shipping

F. Please provide a list of NRC Regulatory Guides and NUREGs that you are currently committed to relative to this program. Please include the revision and/or date for the commitment and where this may be located in your current licensing basis documents.

G. Please provide a summary list of corrective action documents (including corporate and sub-tiered systems) written since the date of the last inspection, related to:

1. Solid radioactive waste
2. Transportation of radioactive material/waste

NOTE: These lists should include a description of the condition that provides sufficient detail that the inspectors can ascertain the regulatory impact, the significance level assigned to the condition, the status of the action (e.g., open, working, closed, etc.) and the search criteria used. Please provide in document formats which are “sortable” and “searchable” so that inspectors can quickly and efficiently determine appropriate sampling and perform word searches, as needed. (Excel spreadsheets are the preferred format.) If codes are used, please provide a legend for each column where a code is used.

H. Copies of training lesson plans for 49 CFR 172, Subpart H, for radwaste processing, packaging, and shipping

I. Provide a summary list or log of radioactive material and radioactive waste shipments for the two most recent calendar years, in addition to the current calendar year.

J. Please provide at least two different radioactive waste stream sample analysis results and resulting scaling factors for the latest two calendar years.

K. A listing of all onsite radwaste storage facilities. Please include a summary or list of the items stored in each facility with the most recent dose rates/surveys.

L. A list of any significant (e.g., DAW, resins, Type B or greater) radioactive shipments that will be completed during our onsite inspection period. If available, please provide the applicable shipping manifests/waste characterizations and most recent surveys for each shipment.

M. A list of significant changes made to the liquid or solid radwaste processing systems since the date of the last inspection. If applicable, please provide the corresponding UFSAR section in which this change was documented. Provide any supportive documentation for the changes made or have it readily available for review.

N. List of radioactive waste processing systems or equipment abandoned in place since the last inspection.

O. Please provide a schedule of radioactive material or waste processing or shipment activities during the inspection week. Please indicate the current storage location of the stored RAM or waste prepared for shipment, as well as any supportive surveys of its measured dose rates. If available, please indicate its current stated waste class.