



July 10, 2019

ULNRC-06522

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

10 CFR 50.73

Ladies and Gentlemen:

**DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC COMPANY
RENEWED FACILITY OPERATING LICENSE NPF-30
LICENSEE EVENT REPORT 2019-002-00
MODE 4 ENTRY WITH INOPERABLE AUXILIARY BUILDING PRESSURE BOUNDARY**

The enclosed license event report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B) to report an operation or condition prohibited by Technical Specifications, entry into Mode 4 from Mode 5 with an inoperable auxiliary building pressure boundary.

This letter does not contain any new commitments.

Sincerely,

A handwritten signature in black ink that reads "Leslie H. Kanuckel".

Leslie H Kanuckel,
Director, Nuclear Organizational
Effectiveness

Enclosure
LER 2019-002-00

cc: Mr. Scott A. Morris
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LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

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Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOF-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Callaway Plant Unit 1	2. DOCKET NUMBER 05000483	3. PAGE 1 of 5
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4. TITLE
Mode 4 Entry with Inoperable Auxiliary Building Pressure Boundary

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	11	2019	2019	- 002	- 000	07	10	2019	FACILITY NAME	05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
10. POWER LEVEL 0%	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
		<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT T.B. Elwood, Supervising Engineer, Regulatory Affairs and Licensing	TELEPHONE NUMBER (Include Area Code) 314-225-1905
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED
 YES (If yes, complete 15. EXPECTED SUBMISSION DATE) NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On May 11, 2019, during mode ascension exiting from Refueling Outage 23, Callaway Plant entered Mode 4 from Mode 5 while not in compliance with Technical Specification 3.7.13, "Emergency Exhaust System (EES)." Specifically, a door that is a part of the Auxiliary Building pressure boundary was not closed prior to Mode 4 entry. This mode transition was not in compliance with the requirements of LCO 3.0.4. This event was previously reported as an event or condition that could have prevented fulfillment of a safety function per ENS 54061, but that notification is being retracted.

This event was caused by the failure to initiate equipment out of service tracking when a pressure boundary door was impaired. Callaway administrative procedures for control of hazard barriers will be revised to ensure that mode change restrictions associated with hazard barrier impairment are appropriately tracked.



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Callaway Plant Unit 1	05000-483	YEAR	SEQUENTIAL NUMBER	REV NO.
		2019	- 002	- 000

NARRATIVE

1. DESCRIPTION OF STRUCTURE(S), SYSTEM(S) AND COMPONENT(S):

The event reported in this LER involves the Emergency Exhaust System (EES) and the auxiliary building pressure boundary. The Emergency Exhaust System (EES: VF) serves both the auxiliary building and the fuel building. Following a safety injection signal (SIS), safety related dampers isolate the auxiliary building, and the EES exhausts potentially contaminated air due to leakage from ECCS systems. The Emergency Exhaust System also can filter airborne radioactive particulates from the area of the fuel pool following a fuel handling accident. A design feature of the auxiliary building is a pressure boundary that ensures that post-accident releases of radioactivity into the auxiliary building are processed through the EES prior to release to the environment.

The EES consists of two independent and redundant trains. Each train consists of a heater, a prefilter, a high efficiency particulate air (HEPA) filter bank, an activated charcoal adsorber section for removal of gaseous activity (principally radiiodines), and a fan. Ductwork, dampers, and instrumentation also form part of the system. A second bank of HEPA filters follows the adsorber section to collect carbon fines.

The Emergency Exhaust System is on standby for an automatic start following receipt of a fuel building ventilation isolation signal (FBVIS) or a safety injection signal (SIS). Initiation of the SIS mode of operation takes precedence over any other mode of operation. In the SIS mode, the system is aligned to exhaust the auxiliary building.

Technical Specification 3.7.13, "Emergency Exhaust System (EES)," provides the Limiting Condition for Operations, Required Actions and Surveillance Requirements for the EES.

2. INITIAL PLANT CONDITIONS:

At the time of the event, Callaway was being taken from Mode 5 to Mode 4 during mode ascension from Refuel Outage 23.

3. EVENT DESCRIPTION:

Door DSK15041, which separates the auxiliary building from the radioactive materials (RAM) storage building (RSB), is identified by APA-ZZ-00750, "Hazard Barrier Program," as a fire, pressure, security, missile, and radiation barrier. The pressure boundary function of the door is required to be Operable (or open under Administrative Controls) in Modes 1-4 per Technical Specification 3.7.13 to maintain Operability of both trains of the Emergency Exhaust System (EES). DSK15041 serves as a part of the Auxiliary Building pressure boundary. There is no Technical Specification requirement for the Auxiliary Building pressure boundary including DSK15041 in Modes 5, 6, or with the core offloaded (in No Mode.) During refueling outages DSK15041 is typically blocked open with a ramp installed over its threshold during refueling outages to allow convenient transportation of various tools and equipment from the Radioactive Material (RAM) Storage Building (RSB) to the Reactor Building.

In 2018, as part of preparations for Refuel Outage 23, Fire Protection Impairment Permit (FPIP) 28523 was written solely to track DSK15041 being open during Modes 5, 6, and No Mode. The FPIP included "Mode 4 restraint" in the Description portion of the permit. Preparation of Equipment Out of Service Logs (EOSLs) for the Refuel did not generate an EOSL to track Auxiliary Building pressure boundary inoperabilites, even though an EOSL request was generated for the job task. EOSL requests are automatically generated based on job location.

At 0157 on April 2, 2019, Callaway entered Mode 5 from Mode 4 as part of a planned cool down for Refuel 23. Approximately 30 minutes after entering Mode 5, the Control Room activated FPIP 28523 to authorize the opening of DSK15041. Job 17514119.510 was then taken to InProgress which opened DSK15041 and installed a ramp weighing

approximately 250 pounds over its threshold. The Job included a task which would remove the ramp and close the door. At the time that FPIP 28523 was activated, the ramp removal and door closure task was scheduled as a Mode 4 predecessor to be worked on May 2, 2019, prior to Mode 4 entry.

As Refuel 23 progressed, emergent work required additional tool support in the Reactor Building and caused delays for entering Mode 4. DSK15041 remained open to support tool movement for this work. On May 11, 2019, Callaway transitioned the plant from Mode 5 to Mode 4. Earlier in the day, the scheduling tie between the ramp removal/door closure task and Mode 4 was broken. This break was made because there was no EOSL attached to the Job and no mode restraint on the task.

Prior to the mode change, the on-shift operations crew had completed the Mode 5 to Mode 4 checklist contained in procedure ODP-ZZ-00014, "Operational Mode Change Requirements". As part of the checklist, a review of EOSL's and EDP-ZZ-04107, "HVAC Pressure Boundary Control," were performed. An operations supervisor also performed a walk down of Auxiliary Building pressure boundary doors, but excluded doors located in Contaminated Areas.

A review of FPIPs was not required by ODP-ZZ-00014 but was performed by the crew prior to entering Mode 4. It was not identified during the review that FPIP 28523 for DSK15041 was a Mode 4 restraint.

Following the Mode change, a fire protection engineer identified during an FPIP review that door DSK15041 was blocked open. The issue was brought to the attention of the control room staff, who dispatched the primary operator to investigate. DSK15041 was confirmed to be open with a ramp installed across its threshold. At this time, the control room entered Technical Specification 3.7.13 Required Action B.1 for both trains of EES being inoperable due to an inoperable Auxiliary Building pressure boundary. The ramp was removed and DSK15041 was closed. Once the door was confirmed closed, Technical Specification 3.7.13 was exited. The plant was in Mode 4 with both trains of EES inoperable for 12 hours and 54 minutes.

4. ASSESSMENT OF SAFETY CONSEQUENCES:

Entering Mode 4 with both trains of the emergency exhaust system (EES) inoperable during the ascension from Refuel Outage 23 did not significantly degrade plant safety. Callaway's current licensing basis identifies Large Break Loss of Cooling Accident (LBLOCA) as the limiting accident sequence for the EES and the Auxiliary Building pressure boundary. The radiological consequence analysis for the LBLOCA sequence presented in Chapter 15 of the Callaway Final Safety Analysis Report (FSAR) credits the EES for reducing the amount of radioactivity released to the environment post-LBLOCA. The analysis of record assumes that once recirculation of containment sump fluids through the emergency core cooling system (ECCS) and containment spray system is initiated, those systems will leak into the Auxiliary Building. A portion of those leaked fluids will then flash to steam and become airborne radioactivity in the Auxiliary Building. The EES reduces the quantity of radioactivity released to the environment by exhausting the Auxiliary Building air through the system's safety-grade charcoal filter adsorber beds.

The licensing basis analysis of record for LBLOCA radiological consequences addresses a fission product mix of 18 isotopes: 13 noble gasses and 5 iodines. The noble gasses are unaffected by filtration. The safety function of the EES is to reduce the quantity of radioiodines released to the environment post-accident. The EES is credited with 90% efficiency for removal of radioiodines. Radiological consequences to offsite and Control Room locations would be driven by the remaining 10% of the radioiodines contained in the flashed fraction of the leaked ECCS recirculation fluids.

Calculated radiological consequences for the LBLOCA ECCS release pathway are directly proportional to the radioactive isotopic inventory present in the core at the time of initiation of the accident sequence. The licensing basis analysis of record is based on the equilibrium inventory that would be present at the end of a continuous full-power run for an 18-month fuel cycle. Callaway entered Mode 4 during the mode ascension at the end of Refuel 23. The most recently irradiated fuel assemblies on site had a minimum subcritical decay time of approximately 40 days when Mode 4 was entered with both trains of the EES declared inoperable due to the inoperable pressure boundary. Additionally, at the time of Mode 4 entry, the Callaway core contained 84 feed assemblies that had not yet been in a critical reactor and thus would not have any fission product inventory. Taking into account the reduced iodine inventory due to the decay time and the feed assemblies, the quantity of radioiodines in the Callaway core would be no more than approximately 1/50 of the equilibrium full-power value used in the licensing basis analysis of record. This would make up for the postulated lost benefit of the EES filtration function. Calculated post-LBLOCA consequences would thus continue to be bounded by the values currently reported in the Callaway FSAR. Therefore, entering Mode 4 with both trains of EES inoperable during the ascension from Refuel Outage 23 did not significantly degrade plant safety.

5. REPORTING REQUIREMENTS:

This LER is submitted pursuant to 50.73(a)(2)(i)(B) as an operation or condition prohibited by Technical Specifications.

Technical Specification LCO 3.7.13 requires that two trains of the Emergency Exhaust System (EES) shall be OPERABLE for the Safety Injection Signal (SIS) mode of operation during Modes 1, 2, 3, and 4. The Bases for Technical Specification 3.7.13 states that the Auxiliary Building pressure boundary is required for the SIS mode of EES operation. LCO 3.7.13 is modified by a Note allowing the Auxiliary Building boundary to be opened intermittently under administrative controls. At the time that Mode 4 was entered during the ascension from Refueling Outage 23, Door DSK15041, which separates the Auxiliary Building from the Radioactive Material (RAM) Storage Building (RSB), and is also a part of the Auxiliary Building pressure boundary, was open. Additionally, a ramp weighing approximately 250 pounds was installed over the threshold of DSK15041. This ramp would have obstructed DSK15041 and prevented timely closure of the door. The configuration of DSK15041 was outside of the provisions of the administrative controls discussed in the LCO 3.7.13 Note and described in the Bases for Technical Specification 3.7.13. Based on this, Callaway was not in compliance with LCO 3.7.13 at the time of Mode 4 entry.

Technical Specification LCO 3.0.4 states that when an LCO is not met, entry into a MODE or other specified condition in the Applicability shall only be made:

- a. When the associated ACTIONS to be entered permit continued operation in the MODE or other specified condition in the Applicability for an unlimited period of time; or
- b. After performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering the MODE or other specified condition in the Applicability, and establishment of risk management actions, if appropriate; exceptions to this Specification are stated in the individual Specifications; or
- c. When an allowance is stated in the individual value, parameter, or other Specification.

Condition B of Technical Specification 3.7.13 addresses two EES trains inoperable due to inoperable auxiliary building boundary in MODE 1, 2, 3, or 4. Required Action B.1 of Technical Specification 3.7.13 requires the restoration of the auxiliary building boundary to OPERABLE status within 24 hours. Therefore, provision (a) of LCO 3.0.4 was not applicable. Additionally, no risk assessment of entering Mode 4 with the Auxiliary Building pressure boundary inoperable had been performed, and provision (c) of LCO 3.0.4 is not applicable.

Based on this, entering Mode 4 while not in compliance with LCO 3.7.13 was an operation or condition prohibited by LCO 3.0.4.

Thus, this event is being reported as an operation or condition prohibited by Technical Specifications in accordance with 50.73(a)(2)(i)(B).

This event was previously reported as an event or condition that could have prevented the fulfillment of a safety function per ENS 54061, which is being retracted. Testing of the plant configuration that existed at the time of Mode 4 entry has demonstrated that although the configuration of the auxiliary building pressure boundary was not in compliance with the LCO requirements of Technical Specification 3.7.13, the pressure boundary was sufficiently intact such that the EES would have been capable of maintaining the auxiliary building at the negative pressure required by the Technical Specification 3.7.13 surveillance requirements. Therefore, the condition reported in this LER would not have prevented the EES from fulfilling its specified safety function, and this LER is not being reported as a condition that would have prevented the fulfillment of a safety function.

6. CAUSE OF THE EVENT:

When the Fire Protection Impairment Permit (FPIP) for Door DSK15041 was activated during the mode descent into Refueling Outage 23, an Equipment Out of Service Log (EOSL) for the Mode 4 restraint with an inoperable Auxiliary Building pressure boundary was not created.

7. CORRECTIVE ACTIONS:

Callaway procedure APA-ZZ-00750, "Hazard Barrier Program," will be revised to include guidance for ensuring an EOSL is created when FIPs that impact Technical Specification related equipment are activated.

8. PREVIOUS SIMILAR EVENTS:

A review of LERs from the past three years found no other events involving Mode 4 entry with an inoperable Auxiliary Building boundary.