Ameren MISSOURI

Callaway Plant

September 17, 2015

ULNRC-06243

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

10 CFR 50.73(a)(2)(i)(A)

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
RENEWED FACILITY OPERATING LICENSE NPF-30
LICENSEE EVENT REPORT 2015-001-00
COMPLETION OF A SHUTDOWN REQUIRED
BY THE TECHNICAL SPECIFICATIONS

The enclosed licensee event report is submitted in accordance with 10CFR50.73(a)(2)(i)(A) to report the completion of a shutdown required by the Technical Specifications.

This letter does not contain new commitments.

Sincerely,

Barry L. Cox
Senior Director, Nuclear Operations

Enclosure

cc: Mr. Marc L. Dapas
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

Senior Resident Inspector
Callaway Resident Office
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Mr. L. John Klos
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Index and send hardcopy to QA File A160.0761

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LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE

Completion of a Shutdown Required by the Technical Specifications – TS 3.4.13

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
07	23	2015	2015	- 001 -	00	09	17	2015	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☒ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
T.B. Elwood, Supervising Engineer, Regulatory Affairs and Licensing	314-225-1905

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☒ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☐ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR
9	30	2016

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

On July 23, 2015, plant operators became aware of indications of an increase in the Reactor Coolant System (RCS) unidentified leak rate. The indications included containment radiation alarms as well as increasing containment humidity and sump levels. An RCS inventory balance indicated an unidentified leak rate of 1.2 gpm leak which is greater than the Technical Specification limit of 1 gpm for unidentified leakage. Actions were taken to determine the source of the leak. A containment entry was made, and a steam cloud was identified to be coming from the Pressurizer Spray Valve cubicle. The plant was shut down in order to comply with requirements of the Technical Specifications.

It was determined that the leak was due to seat leakage through the RCS Pressurizer CVCS Auxiliary Spray Supply Drain valve BBV0400 and then through the non-safety related pipe flange immediately downstream of the valve. The valve was tightened which reduced the leakage to 60 drops per minute. The flange gasket was replaced. Additional causes and corrective actions are still being determined.

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

BBV0400 [EIIS code V] is a drain valve in the Auxiliary Spray line from the Chemical Volume and Control System (CVCS) [EIIS system code CB] to the pressurizer in the Reactor Coolant System [EIIS system code AB]. The valve is an American Society of Mechanical Engineers (ASME) Code Section III Class 2, 3/4-inch welded globe valve. The BBV0400 drain line connection to the Auxiliary Spray header contains a 3/8-inch orifice [EIIS code OR] (upstream of the BBV0400 valve) that serves as the designed Safety Class break between the ASME Class 1 and Class 2 portions of this piping. A non-ASME Class 1, 2, or 3 blind flange is located downstream of valve BBV0400.

The 3/8-inch orifice is a design feature for mitigation of a line break that may be postulated to occur in the Class 2 piping upstream of the drain valve. Specifically, the orifice enables the normal makeup system to the Reactor Coolant System (i.e., the CVCS) to be capable of providing makeup flow while maintaining pressurizer level by limiting the maximum break flow to less than the available charging flow.

2. INITIAL PLANT CONDITIONS:

The plant was in MODE 1 at approximately 100 percent power on July 22, 2015.

3. EVENT DESCRIPTION:

On July 22, 2015, Callaway Plant was operating normally in Mode 1, at approximately 100% reactor power. At 2109, the particulate channel on a containment radiation monitor alarmed in Alert status. This was followed shortly with an alarm on another containment radiation monitor. A ten-minute water inventory balance of the Reactor Coolant System (RCS) was performed and it identified a 1.2 gallon per minute (gpm) leak. Technical Specification (TS) 3.4.13 Condition A was entered due to unidentified RCS leakage greater than 1.0 gpm.

Shortly after midnight on July 23, 2015, a containment entry was made. A steam cloud was identified to be coming from the Pressurizer Spray Valve cubicle. Technical Specification (TS) 3.4.13 Condition B was entered at 0053 based on the inability to rule out pressure boundary leakage. Per TS 3.4.13 Condition B, shut down of the plant due to the inability to rule out pressure boundary leakage was commenced.

A plant load reduction was started at 0115. This was the initiation of a shutdown required by the TS. The NRC was notified of the shutdown initiation via Event Notification 51253. MODE 2 was entered at 0513. MODE 3 was entered at 0600. This was completion of a shutdown required by the TS.

Cooldown of the RCS was initiated at 1210. During the cooldown, the B Main Feedwater Pump was tripped. This led to a manual Auxiliary Feedwater initiation which is discussed in LER 2015-002-00.

At an RCS pressure of approximately 950 psig, a containment entry was made. The leak location was determined to be at the flange downstream of valve BBV0400, CVCS Aux Spray Drain Valve. At this time it was determined that the leakage was unidentified leakage, not RCS pressure boundary leakage. BBV0400 was closed one quarter turn and leakage reduced to approximately 60 drops per minute which is less than the 1 gpm TS limit for unidentified leakage. TS 3.4.13 Conditions B and A were exited at 1725.

The flange downstream of valve BBV0400 was removed, and its Gore-Tex gasket was removed. As noted above, the leakage past BBV0400 valve seat was observed to be 60 drops per minute. A Flexitallic gasket was placed in the flange, and the flange was bolted and tightened to approximately 150 ft-lbs. Later, a RCS heat-up was commenced. At normal operating temperature and pressure, no leakage was observed at BBV0400 valve and flange. The reactor and secondary plant startup was continued.

4. ASSESSMENT OF SAFETY CONSEQUENCES:

As mentioned above, the BBV0400 drain line connection to the Auxiliary Spray header contains a 3/8" orifice that serves as the designed Safety Class break between the ASME Class 1 and Class 2 portions of the piping. This 3/8" orifice is a design feature that enables the normal makeup system to be capable of providing makeup flow while maintaining pressurizer level by limiting the maximum break flow to less than the available charging flow. Although the leak was determined to exceed the TS limit for unidentified leakage, the leak was well within the capacity of a charging pump, as it was much less than the flow that would result from a postulated break in the Class 2 drain line. Thus, there was no significant safety impact on the plant.

In terms of a Probabilistic Risk Assessment (PRA), the leak was classified as a Very Small LOCA. The associated success criteria included charging and secondary or alternate core cooling with RHR in the injection mode, but it did not require RHR recirculation.

The incremental change in core damage frequency was determined to be less than 1E-6; therefore, this event was of very low risk significance.

Use of the PRA model to evaluate the event provides for a comprehensive, quantitative assessment of the potential safety consequences and implications of the event, including consideration of alternative conditions beyond those analyzed in the FSAR.

5. REPORTING REQUIREMENTS:

This LER is submitted pursuant to 10 CFR 50.73(a)(2)(i)(A) to report a completion of a shutdown required by the Technical Specifications. The event, i.e., initiation of a shutdown required by the Technical Specifications due to the leak from the piping around valve BBV0400, was reported to the NRC via Event Notification (EN) 51253 on July 23, 2015.

The manual actuation of the auxiliary feedwater system was reported in Callaway Plant LER 2015-002-00.

6. CAUSE OF THE EVENT:

The cause of the plant shutdown was an RCS leak in excess of the limit specified in the Technical Specifications. It was determined that the leak was due to seat leakage through the RCS Pressurizer CVCS Auxiliary Spray Supply Drain valve BBV0400 and then through the non-safety related pipe flange immediately downstream of the valve. This leakage ultimately placed the plant in Condition B of TS 3.4.13, requiring the plant to be in Mode 3 in 6 hours per Required Action B.1.

The cause of the leakage past the seat of valve BBV0400 will be determined after the upcoming refueling outage.

An update to the cause(s) of the event will be provided via a supplement to the LER.

7. CORRECTIVE ACTIONS:

The leakage past the seat of valve BBV0400 was reduced to approximately 60 drops/minute which is below the TS limit for unidentified leakage of 1 gallon per minute. The valve will be repaired or replaced during the upcoming refueling outage.

The gasket in the flange downstream of valve BBV0400 was replaced with a flexitallic gasket.

An update to the corrective actions will be provided via a supplement to the LER.

8. PREVIOUS SIMILAR EVENTS:

A review of Callaway LERs for the past three years did not find any in which Callaway reported completion of a shutdown required by the Technical Specifications.

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NARRATIVE

In July 2013, Callaway submitted LER 2013-006-00 for RCS leakage from a crack in a socket weld located where a 3/4-inch vent valve is connected to B train injection piping which in turn is connected to a cold leg of the RCS. The estimated leakage rate through the crack was 6 drops per minute.

The plant's corrective action system also documents an event from November 2014 where a sample from a containment radiation monitor showed indication of a possible RCS leak. A socket weld downstream of the CVCS Letdown Orifice B Outlet Throttle Valve developed a leak which required isolation of normal letdown and placing excess letdown in service.