Ameren MISSOURI

Callaway Plant

October 17, 2016

ULNRC-06329

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

10 CFR 50.73(a)(2)(i)(B)
10 CFR 50.73(a)(2)(ii)(B)
10 CFR 50.73(a)(2)(v)(D)

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
RENEWED FACILITY OPERATING LICENSE NPF-30
LICENSEE EVENT REPORT 2016-001-01
CONTROL ROOM AIR CONDITIONING INOPERABILITY DUE TO ESSENTIAL SERVICE WATER PRESSURE TRANSIENT

On June 20, 2016, Callaway submitted LER 2016-001-01 in accordance with 10 CFR 50.73(a)(2)(i)(B) to report a condition prohibited by Technical Specifications 3.7.10 and 3.7.11 due to Control Room Emergency Ventilation System and Control Room Air Conditioning System (CRACS) inoperability, and pursuant to 10 CFR 50.73(a)(2)(v)(D) due to concurrent 'A' Train inoperability of the same systems. The LER was also submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B) to report an unanalyzed condition due to the previously unrecognized impact of an Essential Service Water pressure transient on the 'B' Train Control Room Air Conditioner.

The enclosed supplemental LER, 2016-001-01, is submitted to update the reported times of the loss of safety function due to newly discovered periods of 'A' Train CRACS inoperability during the timeframe of the reported event.

This letter does not contain new commitments.

Sincerely,

Barry Cox
Senior Director, Nuclear Operations

Enclosure: LER 2016-001-01

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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Washington, DC 20555-0001

Index and send hardcopy to QA File A160.0761

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Fort Worth, TX 76107
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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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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.

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

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4. TITLE

Control Room Air Conditioning Inoperability Due To Essential Service Water Pressure Transient

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
04	20	2016	2016	- 001 -	01	10	17	2016	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

No Mode

10. POWER LEVEL

0%

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

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☒ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☒ 50.73(a)(2)(v)(D)	☐ 73.77 (a)(2)(i)
☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
	☐ 50.73(a)(2)(i)(C)	☐ OTHER Specify in the Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	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
B	VI	ACU	Bahnson Ind.	Y					

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 4/20/2016, Callaway received preliminary analysis results showing that during a Design Basis Accident (DBA) the 'B' Train Control Room Air Conditioning System (CRACS) would experience a pressure transient in the associated cooling water system greater than what is experienced during Engineered Safety Feature Actuation Signal (ESFAS) testing. This condition could damage the A/C unit's gaskets, as evidenced during ESFAS testing completed on 4/14/2016, resulting in the affected CRACS and Control Room Emergency Ventilation System (CREVS) trains not being capable of performing their required safety function. This event is being reported as a condition prohibited by Technical Specifications, an unanalyzed condition, and a condition that could have prevented fulfillment of a safety function.

The root cause of the event is that the original Essential Service Water (ESW) system design did not appropriately account for water column separation and collapse pressure transients inherent during operation. Following the 'B' train ESFAS testing on 4/14/2016, more robust gaskets were installed in affected components. A complete evaluation of the pressures and dynamic forces experienced by all ESW system subcomponents will be performed. The results will be compared to current design limits, and appropriate modifications will be performed to ensure sufficient margin exists in the plant design.

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

The Control Room Emergency Ventilation System (CREVS) [System: VI] provides a protected environment from which operators can control the plant following an uncontrolled release of radioactivity. The CREVS consists of two independent, redundant trains that pressurize, recirculate, and filter the control room air. Each CREVS train consists of a filtration system train and a pressurization system train. Per Technical Specification (TS) 3.7.10, "Control Room Emergency Ventilation System (CREVS)," the CREVS is required to be Operable during Modes 1, 2, 3, and 4 as well as during movement of irradiated fuel assemblies.

The Control Room Air Conditioning System (CRACS) [Component: ACU] is a subsystem of the CREVS which provides a suitable atmosphere for personnel and equipment within the control room. The CREVS remains Operable provided the CRACS air flow path is intact and air circulation can be maintained. Isolation or breach of the CRACS air flow path can also render the CREVS flow path inoperable. The CRACS consists of two independent and redundant trains that provide cooling of recirculated control room air. Each train includes a self-contained refrigeration system using essential service water [System: BI] as the safety-related heat sink. The refrigeration system condensers are located on the 'A' and 'B' Control Room Air Conditioning skids (SGK04A/B). Per TS 3.7.11, "Control Room Air Conditioning System (CRACS)," the CRACS is required to be Operable during Modes 1, 2, 3, 4, 5, and 6 as well as during movement of irradiated fuel assemblies.

SGK04A and SGK04B used gaskets made of rubber supplied by the original equipment manufacturer, Bahnson Industries Air Quality Model 09RH070, prior to this event. These rubber gaskets were very flexible and difficult to compress without extruding the gasket material. During Refuel 21, the gaskets of both units were replaced with more robust GORE gaskets.

The Essential Service Water System [System: BI] provides a heat sink for the removal of process operating heat from safety-related components during a design basis accident or transient. During normal operation and shutdown conditions, the ESW system also provides this function for various safety-related and non-safety related components and receives coolant flow from the non-safety related Service Water system [System: KG]. The ESW system consists of two separate, 100% capacity, safety-related cooling water trains. Each train consists of a self-cleaning strainer, prelube tank, one 100% capacity pump, piping, valving, and instrumentation. The pumps and valves are remote and manually aligned except in the unlikely event of a loss of coolant accident (LOCA). The pumps are automatically started upon receipt of a safety injection signal, low suction pressure to the auxiliary feedwater pumps [System: SA Component: P] coincident with an auxiliary feedwater actuation signal (AFAS), or loss of offsite power (LOOP). Upon

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receipt of one of these signals, the automatically actuated essential valves are aligned to their post-accident positions as required. Per TS 3.7.8, "Essential Service Water System (ESW)," two trains of ESW are required to be Operable in Modes 1, 2, 3, and 4 as well as to the extent required to support required equipment in Modes 5 and 6.

The ESW system provides a support function for several supported systems such as Emergency Core Cooling System (ECCS) functions, containment spray and cooling system, auxiliary feedwater system, component cooling water system, ultimate heat sink/cooling tower trains, reactor coolant loops, emergency diesel generators, electrical distribution systems, and CRACS.

2. INITIAL PLANT CONDITIONS:

On 04/20/2016, the plant was in No Mode (reactor vessel head removed with no fuel in the core), at 0% power and normal conditions for a refueling outage. There were no structures, systems, or components inoperable that contributed to the event.

3. EVENT DESCRIPTION:

During each refueling outage, Callaway performs Engineered Safety Feature Actuation Signal (ESFAS) testing. This test verifies, for each train, the correct operation of the ESFAS equipment by shedding and subsequently loading safety-related electrical equipment onto the respective electrical bus. During the test, the ESW pump is stopped and subsequently re-started, thereby subjecting the ESW system to a water pressure transient.

For Refueling Outage 21, the 'B' Train ESFAS test was performed on 04/14/2016. Immediately following performance of the test, a gasket failure on the outlet endbell of SGK04B was identified. At the same time, another gasket leak caused by the ESFAS test ESW pressure transient was observed at the 'B' Train Component Cooling Water (CCW) Pump Room Cooler (SGL11B) in the Auxiliary Building. Leakage from these two components drains to a common Auxiliary Building [System: NF] sump. An estimated leakage rate of 81.5 gpm for the combined leaks was determined using the normal level indication data for the sump. Following the gasket failure, water was identified in both the control and power cabinets for SGK04B. The SGK04B unit was declared inoperable in response to that identified condition.

Following the ESFAS test on 04/14/2016, Callaway investigated the causes of the leaks, including consideration of the fact that SGK04B gasket failure had occurred during ESFAS testing in previous refueling outages. Based on the recurrence of the gasket failures on SGK04B during ESFAS testing, Callaway pursued analysis support from an outside vendor. Previously, the pressure transient seen

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during an ESFAS test was considered to be more severe than what would be experienced during a LOOP. The test pressure transient was considered to be the result of the system alignment used to perform the surveillance test (i.e., with the ESW supply to the Containment Coolers isolated), which is not the same as the system lineup that would exist during an actual LOOP or a Design Basis Accident (DBA) involving generation of a safety injection (SI) signal. On 04/20/2016, Callaway received preliminary analysis results from a vendor showing that the Control Room Air Conditioners would actually experience a greater pressure transient during a DBA than what is currently experienced during ESFAS testing.

Until the 04/14/2016 testing, the rubber gaskets installed on SGK04B were as specified by the original equipment manufacturer (OEM). These gaskets were very flexible and difficult to compress without extruding the gasket material. While no gasket failure was observed at SGK04B during the 'B' train ESFAS testing in Refuel 19, a gasket failure was observed on SGK04B during ESFAS testing in Refuel 20. This failure was attributed to preventive maintenance task execution and inadequate detail in the work instructions. The failed gaskets from Refuel 21 testing had a 4 1/4" section missing after the ESFAS testing. The installed OEM gaskets were relatively new from the vendor, in good condition with no signs of cracking or embrittlement and had been stored per plant storage requirements.

SGK04A is the same design as SGK04B, as it also had the OEM rubber gasket installed in the inlet and outlet heads of the unit prior to the 04/14/2016 event. However, the configuration of the ESW piping to SGK04A is different than SGK04B, and as a result, the ESW cooling water pressure transient for SGK04A is less severe.

4. ASSESSMENT OF SAFETY CONSEQUENCES:

In light of the 30-day mission time required for the CRACS safety function, the degraded condition associated with SGK04B (with the OEM gasket installed) would have prevented the unit from performing its specified safety functions, if the unit had been called upon during a Design Basis Accident (DBA) at any time during the past three years (i.e., the timeframe for reportability evaluations). The degraded condition existed during all TS-required Modes of Applicability (i.e., Modes 1 through 6, and during movement of irradiated fuel assemblies).

As explained above, the 'A' train CRACS was not subject to the failure identified for SGK04B, and therefore, it would have been able to perform the required CRACS specified safety functions at all times that the degraded condition existed on SGK04B, except during SGK04A maintenance windows.

Per the Bases for TS 3.7.11, "The design basis of the CRACS is to maintain the control room

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temperature for 30 days of continuous occupancy." In the event that both trains of CRACS were unable to perform this design basis function, additional measures would be taken by control room personnel to mitigate Control Room temperature increase.

Operations procedure OTO-GK-00001, "Loss of Control Room HVAC," is entered "in the event that all Control Room HVAC is inoperable and incapable of cooling." This procedure directs establishing temporary ventilation to the Control Room by opening various interior and exterior doors from the Control Room, and by opening electrical cabinet doors in the Control Room. In addition, the procedure also directs the deployment of temporary air moving equipment throughout the Control Room.

Due to the long term nature of room heat up, loss of the CRACS would not immediately render the Control Room uninhabitable or cause equipment damage even if temporary ventilation to the Control Room is not able to be promptly established. Adequate time would exist to safely respond to any DBA and place the plant in a safe shutdown condition. Complete loss of the CRACS would only impact the ability of operators to control the plant during long term core cooling and accident recovery.

The CREVS provides a protected environment from which operators can control the unit following an uncontrolled release of radioactivity. Per the Bases for TS 3.7.10, the CRACS is considered a subsystem of the CREVS. For a train of CREVS to be Operable the corresponding train of CRACS must be Operable. The Bases also state, "In order for the CREVS trains to be considered Operable, the Control Room Envelope (CRE) and Control Building Envelope (CBE) boundaries must be maintained such that the CRE occupant dose from a large radioactive release does not exceed the calculated does in the licensing basis consequence analyses for DBA's." The degraded condition of SGK04B did not impact the integrity of the CBE or the CRE, thus minimizing any potential dose impact to the Control Room. In addition, the 'A' train CREVS would have been able to perform the required CREVS specified safety functions at all times that the degraded condition existed on the 'B' train CRACS/CREVS, except during 'A' train CREVS maintenance windows.

5. REPORTING REQUIREMENTS:

This LER is submitted pursuant to 10 CFR 50.73(a)(2)(i)(B) to report a condition prohibited by the Technical Specifications, and pursuant to 10 CFR 50.73(a)(2)(ii)(B), to report an unanalyzed condition that significantly degraded plant safety. This LER is also being submitted pursuant to 10 CFR 50.73(a)(2)(v)(D) to report a condition that could have prevented fulfillment of a safety function of structures or systems that are needed to mitigate the consequences of an accident. As already noted, due to the likelihood of unacceptable gasket leakage resulting from ESW pressure transient damage during an ESFAS actuation, it has been determined that the 'B' Control Room Air Conditioner train was inoperable

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for the previous 3 years, which exceeded the TS 3.7.11 Required Action A.1 Completion Time of 30 days (for restoring an inoperable CRACS train to Operable status). Because the Control Room Air Conditioner is a direct support component of the Control Room Emergency Ventilation System (CREVS), the inability of SGK04B to perform its specified safety function also rendered the 'B' CREVS train inoperable for the previous 3 years, which exceeded the TS 3.7.10 Required Action A.1 Completion Time of 7 days (for restoring an inoperable CREVS train to Operable status). The identified condition thus caused the affected train in each of these systems to be inoperable for a time longer than allowed by the TSs (during applicable Modes).

With respect to reporting requirement 10 CFR 50.73(a)(2)(v)(D), i.e., a condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident, Section 3.2.7 of NUREG-1022 Revision 3 provides the following guidance for reporting:

> "A SSC that has been declared inoperable is one in which the SSC capability is degraded to a point where it cannot perform with reasonable expectation or reliability."
>
> "As a result, for SSCs within the scope of this criterion, a report is required when 1) there is a determination that the SSC is inoperable in a required mode or other specified condition in the TS Applicability, 2) the inoperability is due to one or more personnel errors, including procedure violations; equipment failures; inadequate maintenance; or design, analysis, fabrication, equipment qualification, construction, or procedural deficiencies, and 3) no redundant equipment in the same system was operable"

During the period of time between 04/20/2013 and 04/20/2016, while the 'B' CRACS and CREVS trains were inoperable for mitigation of a LOOP accident, the redundant 'A' trains were inoperable as follows:

- 'A' CREVS train inoperable from 0138 on 05/01/2013 to 1920 on 05/03/2013 and 'A' CRACS train inoperable from 0138 on 05/01/2013 to 0537 on 05/04/2013
- 'A' CREVS train inoperable from 1010 to 1139 on 06/17/2013
- 'A' CREVS train inoperable from 1624 to 2257 on 06/20/2013 and 'A' CRACS train inoperable from 1018 on 06/20/2013 to 0039 on 06/22/2013
- 'A' CREVS train inoperable from 1817 to 2034 on 06/21/2013
- 'A' CRACS train inoperable from 0328 on 09/11/2013 to 0530 on 09/11/2013
- 'A' CRACS train inoperable from 1450 on 10/13/2013 to 1334 on 10/14/2013
- 'A' CRACS train inoperable from 1052 to 1622 on 12/04/2013

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- 'A' CREVS train and 'A' CRACS train inoperable from 0702 on 01/27/2014 to 2256 on 01/30/2014
- 'A' CRACS train inoperable from 0909 on 02/06/2014 to 2250 on 02/06/2014
- 'A' CREVS train inoperable from 1336 on 02/25/2014 to 1526 on 02/25/2014
- 'A' CRACS train inoperable from 0726 on 04/21/2014 to 1205 on 04/21/2014
- 'A' CRACS train inoperable from 0924 on 06/20/2014 to 0942 on 06/20/2014
- 'A' CRACS train inoperable from 0750 on 07/16/2014 to 1230 on 07/16/2014
- 'A' CRACS train inoperable from 1358 on 09/12/2014 to 1408 on 09/12/2014
- 'A' CRACS train inoperable from 0742 on 09/30/2014 to 1151 on 09/30/2014
- 'A' CREVS train inoperable from 0838 on 10/24/2014 to 2030 on 10/27/2014 and 'A' CRACS train inoperable from 1519 on 10/23/2014 to 1205 on 10/29/2014
- 'A' CRACS train inoperable from 0632 on 12/31/2014 to 1121 on 12/31/2014
- 'A' CRACS train inoperable from 0908 on 01/02/2015 to 0934 on 01/02/2015
- 'A' CRACS train inoperable from 0909 on 02/27/2015 to 0915 on 02/27/2015
- 'A' CRACS train inoperable from 0720 on 03/25/2015 to 1214 on 03/25/2015
- 'A' CRACS train inoperable from 1037 on 05/22/2015 to 1043 on 05/22/2015
- 'A' CRACS train inoperable from 0925 to 1152 on 06/15/2015
- 'A' CRACS train inoperable from 1545 on 06/15/2015 to 1604 on 06/15/2015
- 'A' CREVS and 'A' CRACS train inoperable from 0400 on 06/16/2015 to 1422 on 06/17/2015
- 'A' CREVS train inoperable from 0820 to 1040 on 06/18/2015
- 'A' CRACS train inoperable from 1236 on 08/14/2015 to 1243 on 08/14/2015
- 'A' CREVS train inoperable from 1649 to 2224 on 08/14/2015
- 'A' CRACS train inoperable from 1938 on 09/01/2015 to 0422 on 09/02/2015
- 'A' CRACS train inoperable from 0806 on 11/06/2015 to 0823 on 11/06/2015
- 'A' CRACS train inoperable from 0754 on 11/30/2015 to 1048 on 11/30/2015
- 'A' CRACS train inoperable from 1005 on 01/29/2016 to 1012 on 01/29/2016
- 'A' CRACS train inoperable from 1332 on 02/24/2016 to 1503 on 02/24/2016
- 'A' CRACS train inoperable from 0355 on 04/07/2016 to 0527 on 04/10/2016

During these windows of 'A' train CREVS and/or CRACS inoperability, there was no Operable train to perform the respective accident mitigation function(s). As such, this event is reportable per 10 CFR 50.73(a)(2)(v)(D).

NRC FORM 366a (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET		3. LER NUMBER		
			YEAR	SEQUENTIAL NUMBER	REV NO.
Callaway Plant Unit 1	05000-	483	2016	- 001	- 01

NARRATIVE

With respect to reporting requirement 10 CFR 50.73(a)(2)(ii)(B), i.e., an unanalyzed condition that significantly degraded plant safety, the identified condition was determined to be reportable per this criterion as well.

NUREG-1022 Section 3.2.4 Revision 3 provides the following reporting guidance:

> "The level of significance of these cases generally corresponds to the inability to perform a required safety function. For instance, accumulation of voids that could inhibit the ability to adequately remove heat from the reactor core, particularly under natural circulation conditions, has an effect similar to a condition that could prevent the fulfillment of the safety function of the AFW system."

In this case, it was determined that the pressure transient which could be experienced during a LOOP or accident involving an ESFAS actuation would have been worse than previously analyzed. This unanalyzed condition was determined to have significantly degraded plant safety, prior to gasket replacement in Refuel Outage 21, since the noted trains/systems could have been rendered inoperable upon demand. Therefore, this event is being reported as an unanalyzed condition that significantly degraded plant safety.

While it is recognized that the same ESW water pressure transient could impact ESW piping and other ESW-supplied components; testing, operational experience, and technical evaluation provide reasonable assurance that these other locations would not have been impacted to a degree that would have prevented the piping or components from performing their required safety functions.

6. CAUSE OF THE EVENT:

The root cause of the system inoperabilities and unanalyzed condition discussed in this report has been determined to be that the original ESW system design did not appropriately account for pressure transients due to water column separation and collapse during operation, particularly during an ESFAS actuation in an accident or event involving a LOOP. The ESW system pressure transients during testing, normal operations, or accident response were not completely understood. As discussed in the event description, the station previously considered the ESFAS test lineup to be a more limiting configuration in terms of pressure transients induced in the system. This led to an inaccurate basis for assumptions and an inaccurate mental model being applied to previous evaluations of the ESW system pressure transients. Also contributing was that prior Corrective Actions for ESW system gasket failures were focused on operational procedures and system hardening and not on mitigation of the ESW dynamic pressure transient.

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1. FACILITY NAME	2. DOCKET		3. LER NUMBER		
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Callaway Plant Unit 1	05000-	483	2016	- 001	- 01

NARRATIVE

7. CORRECTIVE ACTIONS:

Following the 'B' train ESFAS testing on 04/14/2016, more robust gaskets were installed at the inlet and outlet of SGK04A, SGK04B, as well as the 'A' and 'B' train Class 1E Electrical Equipment Air Conditioners (SGK05A/B). A more robust gasket was also installed at the outlet of SGL11B at that time. To prevent recurrence of the root cause, a complete evaluation of the pressures and dynamic forces experienced by the 'A' and 'B' train ESW system subcomponents will be performed. The results of that evaluation will then be compared to the current design limits of the subcomponents. For ESW subcomponents that are subject to pressures and/or dynamic forces greater than design limits, modifications will be implemented as necessary to either reduce the pressures and/or dynamic forces seen by the components or increase the design limits of the subcomponents such that the system design limit is greater than experienced pressures and/or forces.

8. PREVIOUS SIMILAR EVENTS:

A review of Callaway LERs for the past three years did not find any in which Callaway reported a condition prohibited by technical specifications, an unanalyzed condition that significantly degraded plant safety, or a condition that could have prevented fulfillment of a safety function due to a system pressure transient or gasket failure. However, two Corrective Action documents were previously initiated to identify adverse trends in leakage during ESFAS testing at Callaway. Those two documents, i.e. CAR 200703313 and CAR 201303502 (written in 2007 and 2013, respectively) are included as internal Operating Experience in the Root Cause Analysis for the current event.