DUKE ENERGY®

Sheila Dalton
Manager, Nuclear Support Services
Oconee Nuclear Station

Duke Energy
ON01SC | 7800 Rochester Hwy
Seneca, SC 29672
o: 864.873.3657
m: 864.710.3972

Sheila.Dalton@duke-energy.com

RA-19-0376

September 19, 2019 10 CFR 50.73

Attn: Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2746

Duke Energy Carolinas, LLC
Oconee Nuclear Station Unit 1
Docket Numbers: 50-269
Renewed Operating Licenses: DPR-38

Subject: Licensee Event Report 269/2019-002, Revision 00 – Unit 1 Core Flooding System Loss of Safety Function

Licensee Event Report 269/2019-002, Revision 00, is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

There are no regulatory commitments associated with this LER.

There are no unresolved corrective actions necessary to restore compliance with NRC requirements.

If there are questions, or further information is needed, contact Terry King, Regulatory Affairs, at (980) 373-3979.

Sincerely,

Sheila Dalton

Sheila Dalton
Manager, Nuclear Support Services
Oconee Nuclear Station

Enclosure

cc (w/Enclosure):

Ms. Laura Dudes, Administrator, Region II
U.S. Nuclear Regulatory Commission
Marquis One Tower
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

Ms. Audrey L. Klett, Project Manager
(by electronic mail only)
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Mail Stop O-08B1A
Rockville, MD 20852-2738

Mr. Jared Nadel
NRC Senior Resident Inspector
Oconee Nuclear Station

NRC FORM 366 (04-2018)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

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.

LICENSEE EVENT REPORT (LER)

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

(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/)

1. Facility Name	2. Docket Number	3. Page
Oconee Nuclear Station Unit 1	05000269	1 OF 4

4. Title

Unit 1 Core Flooding System Loss of Safety Function

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
									NA	05000
07	24	2019	2019	002	00	09	19	2019	Facility Name	Docket Number
									NA	05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*			
1	☐ 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)
10. Power Level	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
99.999	☐ 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)(ii)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(iii)
		☐ 50.73(a)(2)(i)(C)	☐ Other (Specify in Abstract below or in NRC Form 366A)	

12. Licensee Contact for this LER

Licensee Contact	Telephone Number (Include Area Code)
Terry W. King, Nuclear Licensing Consultant, Corporate Regulatory Affairs	(980) 373-3979

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable To ICES	Cause	System	Component	Manufacturer	Reportable To ICES
X	BQ	ISV	E331	Y					

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☐ Yes (If yes, complete 15. Expected Submission Date) X No				

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On July 24, 2019 with Unit 1 in Mode 1, Operations was venting the 1A Core Flood Tank (CFT) in accordance with plant procedures to lower the nitrogen pressure. Upon reaching the desired pressure, Operations attempted to stop the venting by closing a remotely-operated isolation valve (1CF-5) in the vent line. This valve failed to fully close which resulted in the 1A CFT pressure continuing to drop below the Technical Specification (TS) required limit of 575 psig. Another manually-operated isolation valve was closed and nitrogen was added to the 1A CFT to restore pressure within the TS required range.

While the Core Flood System contains two (2) Core Flood Tanks, both tanks are required to mitigate certain accident scenarios and is considered a single-train system. When the 1A CFT became inoperable as a result of a component failure, it resulted in a loss of safety function and is therefore being reported under 10 CFR 50.73(a)(2)(v)(d).

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Oconee Nuclear Station Unit 1	05000269	2019	002	00

NARRATIVE

BACKGROUND

The function of the Emergency Core Cooling System (ECCS) Core Flood Tanks (CFT) [EIIS: BQ] is to provide water to the reactor vessel during the blowdown phase of a loss of coolant accident (LOCA), to provide inventory to help accomplish the refill phase that follows thereafter, and to provide Reactor Coolant System (RCS) makeup for a small break LOCA. Two CFTs are provided for these functions. Both CFTs are required to function in the event of a large break LOCA.

The CFTs are pressure vessels partially filled with borated water and pressurized with nitrogen gas. The CFTs are passive components, since no operator or control actions are required for them to perform their function. Internal tank pressure is sufficient to discharge the contents of the CFTs to the RCS if RCS pressure decreases below the CFT pressure. Each CFT is piped separately into the reactor vessel downcomer. Each CFT is isolated from the RCS by a motor operated isolation valve and two check valves in series. The motor operated isolation valves are normally open, with power removed from the valve motor to prevent inadvertent closure prior to or during an accident. Connections are provided for adding both borated water and nitrogen during power operation so that the proper level and pressure can be maintained.

The minimum nitrogen cover pressure requirement of 575 psig (allowable value) ensures that the contained gas volume will generate discharge flow rates during injection that are consistent with those assumed in the safety analysis.

The maximum nitrogen cover pressure limit of 625 psig (allowable value) ensures that the amount of CFT inventory that is discharged while the RCS depressurizes, and is therefore lost through the break, will not be larger than that predicted by the safety analysis.

The CFTs thus form a passive system for injection directly into the reactor vessel. Except for the core flood line break LOCA, a unique accident that also disables a portion of the injection system, both tanks are assumed to operate in the safety analyses for Design Basis Events.

This safety function is required by Tech Spec 3.5.1 - Core Flood Tanks (CFTs)
LCO 3.5.1 Two CFTs shall be OPERABLE.
APPLICABILITY: Modes 1 and 2, Mode 3 with RCS pressure > 800 psig.
SR 3.5.1.3 states: Verify nitrogen cover pressure in each CFT is > 575 psig and < 625 psig.

CF-5 is a QA-1, Class 1500, 1" globe valve manufactured by Edwards. Its actuator is a Limitorque SMB-000, with a 208VAC, 2 ft-lb motor.

EVENT DESCRIPTION
On July 24, 2019 at 0400 hours the Oconee Unit 1 Control Room began a planned depressurization of the 1A CFT in accordance with plant procedures. Previously CFT pressure had been slowly increasing due to increasing ambient temperature. The tank is vented through 1CF-5 to the Unit 1 Quench Tank. At approximately 602.5 psig lowering in 1A CFT, the depressurization was stopped by closing 1CF-5 to allow venting of the Unit 1 Quench Tank. Once the Quench Tank was vented, 1A CFT depressurization resumed. When pressure in the 1A CFT reached approximately 600 psig lowering, Operations attempted

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Oconee Nuclear Station Unit 1	05000269	2019	002	00

NARRATIVE

to stop the depressurization by closing 1CF-5. 1CF-5 failed to fully close. In accordance with the procedure, Operators staged at the breaker for 1CF-5 reset the breaker and another attempt was made to close 1CF-5. 1CF-5 indicated closed on the Operator Aid Computer (OAC) and the control board but 1A CFT pressure continued to decrease at approximately seven (7) psi/minute. At 0432 hours 1A CFT pressure reached 575 psig lowering and the 1A CFT was declared inoperable in accordance with TS 3.5.1 for an inoperable CFT which requires the CFT to be restored to operable status within one (1) hour. Operators were dispatched to align nitrogen to pressurize the 1A CFT per procedure while venting continued through 1CF-5 to the Quench Tank. At 0454 hours 1A CFT pressure reached 437 psig and pressurization of the 1A CFT began. At 0526 hours 1A CFT pressure reached 575 psig increasing and TS 3.5.1 was exited. At 0744 hours 1CF-16, a manual isolation valve in the vent line, was closed and the nitrogen make-up was secured. 1A CFT pressure was 612 psig and stable. At 1217 hours 1CF-5 was manually closed and torqued to 41 ft.lbs. 1A CFT pressure remained 612 psig and stable. 1CF-16 was returned to approximately 1 turn open at 1226 hours.

After further review it was determined that the 1A CFT remained inoperable from the time of pressure being below the TS 3.5.1 required limit (575 psig at 0432 hours) until the time that both pressure was in the band required by TS 3.5.1 and the nitrogen leakage was stopped by closing 1CF-16 (0744 hours). This resulted in entering action statement TS 3.5.1 Condition C with a required action of entering Mode 3 in 12 hours between 0532 hours until 0744 hours on 7/24/19. Additionally, the 1A CFT was Operable but Degraded Non-Conforming for the time that 1CF-16 was used as a pressure boundary (0744 hours) until such time that 1CF-5 was fully closed and 1CF-16 was returned to its normal position (1226 hours).

While the Core Flood System for each unit contains two (2) Core Flood Tanks, both tanks are required to mitigate certain accident scenarios so it is considered a single-train system. When the CFT isolation valve became inoperable as a result of a component failure, it resulted in a loss of safety function and is therefore being reported under 10 CFR 50.73(a)(2)(v)(d).

CAUSAL FACTORS

The loss of pressure in the 1A CFT was a result of 1CF-5 failing to fully close upon demand. Additional investigation is planned to determine the cause of the valve's failure to close.

CORRECTIVE ACTIONS

1. The vent line was manually isolated.
2. Nitrogen was added to the 1A CFT to restore pressure to within the TS required range.
3. 1CF-5 was manually closed.

SAFETY ANALYSIS

UFSAR Chapters 6 and 15 transients were reviewed for scenarios where the CFTs are credited to mitigate the event. This review identified two (2) design basis events which required additional evaluation. Each design basis event was evaluated for impact, and potentially affected cases were evaluated assuming each CFT performs in accordance with the plant conditions that occurred during this event.

A limiting full power UFSAR 15.13 case for Large Steam Line Break from Full Power from the current analysis of record (AOR) was reanalyzed for this event. The results demonstrated that even with the low 1A CFT pressure, actual plant conditions were still bounded by the accident analysis.

Several loss of coolant accident (LOCA) UFSAR 15.14 cases were reanalyzed for this event with consideration of the

degraded 1A CFT condition. The results of the analysis demonstrate the peak cladding temperatures (PCT) and cladding oxidation remains within the 10 CFR 50.46 acceptance criteria.

The results of these evaluations determined that this event did not significantly degrade plant safety.

ADDITIONAL INFORMATION

Energy Industry Identification System (EIIS) codes are identified in the text as [XX]. This event is considered INPO Consolidated Events System (ICES) reportable. There were no releases of radioactive materials, radiation exposures or personnel injuries associated with this event.