



William Gunter
Nuclear Support Services Manager
Shearon Harris Nuclear Power Plant
5413 Shearon Harris Road
New Hill, NC 27562-9300

10 CFR 50.73

December 20, 2022
Serial: RA-22-0328

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

Shearon Harris Nuclear Power Plant, Unit 1
Docket No. 50-400/Renewed License No. NPF-63

Subject: Licensee Event Report 2022-006-00

Ladies and Gentlemen:

Duke Energy Progress, LLC, submits the enclosed Licensee Event Report 2022-006-00 in accordance with 10 CFR 50.73 for Shearon Harris Nuclear Power Plant, Unit 1 (HNP). This report describes a condition associated with inoperability of the auxiliary feedwater pumps. This event had no significance with respect to the health and safety of the public.

There are no regulatory commitments contained within this report.

Please refer any questions regarding this submittal to Sarah McDaniel at (984) 229-2002.

Sincerely,

A handwritten signature in blue ink, appearing to read "William D. Gunter", with a long horizontal flourish extending to the right.

William Gunter

Enclosure: Licensee Event Report 2022-006-00

cc: P. Boguszewski, NRC Senior Resident Inspector, HNP
M. Mahoney, NRC Project Manager, HNP
NRC Regional Administrator, Region II

(08-2020)



LICENSEE EVENT REPORT (LER)

(See Page 3 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/)

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, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollections.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk ail: oira_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name: Shearon Harris Nuclear Power Plant, Unit 1
2. Docket Number: 05000
3. Page: 1 OF 4

4. Title: Auxiliary Feedwater Pump Inoperability

Table with 8 columns: 5. Event Date, 6. LER Number, 7. Report Date, 8. Other Facilities Involved. Includes sub-headers for Month, Day, Year, Sequential Number, Revision No., Facility Name, and Docket Number.

9. Operating Mode: 3
10. Power Level: 000

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

Table for 10 CFR Part 20, 21, 50, and 73. Includes checkboxes for various regulatory sections like 20.2203(a)(2)(vi), 50.36(c)(2), 50.73(a)(2)(iv)(A), etc.

OTHER (Specify here, in abstract, or NRC 366A).

12. Licensee Contact for this LER

Licensee Contact: Sarah McDaniel, Regulatory Affairs Engineer
Phone Number (Include area code): (984) 229-2002

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

Table with 10 columns: Cause, System, Component, Manufacturer, Reportable to IRIS, Cause, System, Component, Manufacturer, Reportable to IRIS. Row 1: X, BA, FCV, M120, Y.

14. Supplemental Report Expected: [X] Yes (If yes, complete 15. Expected Submission Date)
15. Expected Submission Date: Month 03, Day 20, Year 2023

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)
At 20:50 Eastern Daylight Time on October 27, 2022, with Shearon Harris Nuclear Power Plant, Unit 1 (HNP), in Mode 3, conditions existed such that all auxiliary feedwater (AFW) pumps were declared inoperable. The capability to throttle flow to the 'B' steam generator was not maintained due to improper operation of a flow control valve, 1AF-51, which is located in the discharge piping line to the 'B' steam generator from the common header of the motor-driven AFW pumps. Since 1AF-51 operation can impact AFW flow control from the common header of the motor-driven AFW pumps, both motor-driven AFW pumps were declared inoperable. The turbine-driven AFW pump was inoperable at the time of this event due to incomplete post-maintenance testing following planned maintenance. The motor-driven AFW pumps were able to supply discharge flow to the steam generators during this event since the 1AF-51 failure never impacted the valve's ability to open. Based upon the declared inoperability of all three AFW pumps, this condition was reported on October 28, 2022, under 10 CFR 50.72(b)(3)(v) as a condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to: (D) mitigate the consequences of an accident, by event notification number 56186. This event had no impact on the health and safety of the public. The cause of the 1AF-51 inoperability was an actuator malfunction. The actuator for 1AF-51 was replaced to restore proper flow control capability. Causal factors for the actuator malfunction will be determined from the ongoing cause evaluation. Once the evaluation is complete, a supplemental report will be issued containing the causal factors for this event.



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

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Shearon Harris Nuclear Power Plant, Unit 1	05000- 400	2022	006	00

NARRATIVE

Note: Energy Industry Identification System (EIIIS) codes are identified in the text within brackets [].

A. Background

Prior to the event, Shearon Harris Nuclear Power Plant, Unit 1 (HNP), was operating in Mode 3 following completion of a refueling outage. The turbine-driven auxiliary feedwater (AFW) pump [BA P] was inoperable at the time of this event. No other structures, systems, or components were inoperable at the time that contributed to the event.

AFW system [BA] operability ensures that the reactor coolant system (RCS) [AB] can be cooled down to less than 350 degrees Fahrenheit from normal operating conditions so that the residual heat removal (RHR) system [BP] may be placed into operation. The AFW system provides decay heat removal immediately following a station blackout event, and is required to mitigate the loss of normal feedwater [SJ] and feedwater line break accidents analyzed in the HNP Final Safety Analysis Report (FSAR).

The flow control valve, 1AF-51 [FCV], is normally open and is located in the discharge piping line to the 'B' steam generator [SG] from the common header of the motor-driven AFW pumps [BA Ps]. This valve must be capable of automatically opening, if closed or throttled closed for low power or shutdown of feedwater flow, upon generation of any signal which starts the motor-driven AFW pumps. This function is necessary to provide a path for AFW flow to the associated steam generator. An electrohydraulic hydramotor actuator is used to control 1AF-51 position that energizes-to-close and returns open by a spring upon decrease in control signal or interruption of control power. 1AF-51 must also be capable of automatic closure on receipt of an AFW isolation signal. This isolation function protects against feeding AFW to a faulted steam generator and assures that minimum required flow is directed to the unaffected steam generators for the RCS cooldown. The valve is installed in series with an isolation valve, 1AF-93 [ISV], that receives its power supply from a separate engineered safety features (ESF) [JE] bus to ensure isolation of a faulted steam generator in the event of a single active failure of either valve.

The HNP Technical Specification (TS) 3.7.1.2 limiting condition for operation (LCO) requires at least three independent steam generator AFW pumps and associated flow paths to be operable in Modes 1, 2, and 3. With one AFW pump inoperable, action must be taken to restore the required AFW pumps to operable status within 72 hours or in accordance with the risk-informed completion time program or to be in at least hot standby within the next 6 hours and in hot shutdown within the following 6 hours. With two AFW pumps inoperable, action must be taken to be in at least hot standby within 6 hours and in hot shutdown within the following 6 hours. With three AFW pumps inoperable, action must be taken immediately to initiate corrective action to restore at least one AFW pump to operable status as soon as possible.

Based upon the declared inoperability of all three AFW pumps, this condition was reported under 10 CFR 50.72(b)(3)(v) as a condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to: (D) mitigate the consequences of an accident, by event notification number 56186. This condition is also reportable under 10 CFR 50.73(a)(2)(v) as "any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to: "(D) mitigate the consequences of an accident."

Based upon 1AF-51 demonstrating the same control malfunction following the reactor trip on October 30, 2022, at 06:53 Eastern Daylight Time (EDT) as it did on October 20, 2022, HNP personnel have concluded that 1AF-51 was inoperable while HNP was in Modes 1, 2, and 3 beginning from the initial Mode 3 entry ascending on October 27, 2022, at 13:32 EDT through October 31, 2022, at 11:22 EDT. Therefore during this time period, HNP was in Modes 1, 2, and 3 with two AFW pumps inoperable after the turbine-driven AFW pump was restored to operable on October 29, 2022, at 06:25 EDT, for greater than six hours, which does not meet the TS 3.7.1.2 LCO. TS LCO 3.0.4 requires all LCOs to be met for the plant



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NARRATIVE

condition to be entered, prior to entry. Therefore, this event is reportable per 10 CFR 50.73(a)(2)(i)(B) as “any operation or condition which was prohibited by the plant’s Technical Specifications.”

B. Event Description

At 20:50 EDT on October 27, 2022, with HNP in Mode 3, conditions existed such that all AFW pumps were declared inoperable. The capability to throttle flow to the 'B' steam generator was not maintained due to improper operation of 1AF-51, which is located in the discharge piping line to the 'B' steam generator from the common header of the motor-driven AFW pumps. Since 1AF-51 operation can impact AFW flow control from the common header of the motor-driven AFW pumps, both motor-driven AFW pumps were declared inoperable. The turbine-driven AFW pump was inoperable at the time of this event due to incomplete post-maintenance testing following planned maintenance. The motor-driven AFW pumps were able to supply discharge flow to the steam generators during this event since the 1AF-51 failure never impacted the valve's ability to open.

1AF-51 was considered to be operable on October 28, 2022, at 11:22 EDT, following an oil change on the actuator, connection checks, and an acceptable stroke test. The turbine-driven AFW pump operability was restored on October 29, 2022, at 06:25 EDT. HNP entered Mode 2 on October 29, 2022, at 08:14 EDT and entered Mode 1 on October 29, 2022, at 20:11 EDT with all AFW pumps considered to be operable. On October 30, 2022, at 06:53 EDT, 1AF-51 was declared inoperable due to not throttling shut as expected following a reactor trip while HNP was in Mode 3. Based upon investigation, it was determined that the 1AF-51 actuator installed during the refueling outage on October 20, 2022, needed to be replaced and that the valve actuator was not reliable while HNP was in Modes 1, 2, and 3 from October 27, 2022, at 13:32 EDT through October 31, 2022, at 11:22 EDT when HNP entered Mode 4 to repair the 1AF-51 actuator. Since HNP remained in Modes 1, 2, and 3 for greater than six hours with 1AF-51 inoperable, TS 3.7.1.2 LCO was not met.

C. Causal Factors

The cause of the 1AF-51 inoperability was an actuator malfunction. Causal factors for the actuator malfunction will be determined from the ongoing cause evaluation. Once the evaluation is complete, a supplemental report will be issued containing the causal factors for this event.

D. Corrective Actions

The actuator for 1AF-51 was replaced to restore proper flow control capability. Additional actions will be determined as needed following completion of the cause evaluation.

E. Safety Analysis

The AFW system is designed to detect conditions indicative of a steam line or feedwater line break and automatically isolate AFW flow to the affected steam generator. Although isolation of AFW flow to the faulted steam generator will occur within about sixty seconds, the steam line break analysis conservatively delayed AFW isolation until ten minutes. The feedline break analysis assumes only two AFW pumps are available, and one steam generator is isolated within sixty seconds. Prompt isolation is conservative for this analysis, so any delay in isolation would be a benefit to the analysis results. Two cases are evaluated in this analysis. One case assumes offsite power is maintained with one motor-driven AFW pump feeding two intact steam generators and the other case assumes a loss of offsite power with two motor-driven AFW pumps feeding two intact steam generators. The results of this analysis show that there is adequate AFW flow to remove decay heat through two steam generators.



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During the time period that 1AF-51 was inoperable, 1AF-93 was operable and available to isolate the 'B' steam generator and to control 'B' steam generator level to prevent an overflow condition. Operators have procedure guidance to use 1AF-93 as needed to control 'B' steam generator level and did so following the reactor trip on October 30, 2022. There is a reasonable expectation that the safety function would have been fulfilled with 1AF-93 operation. 1AF-51 was considered inoperable due to the inability to throttle close to control and isolate AFW flow as needed. Therefore, the 1AF-51 inability to stroke close within its assumed ESF response time did not challenge assumptions in the HNP FSAR accident analysis, since 1AF-93 was available to isolate the 'B' steam generator. The condition did not result in a safety system functional failure and had no adverse impact on the health and safety of the public.

NEI 99-02, Revision 7, "Regulatory Assessment Performance Indicator Guidelines," states the following for inclusion of events on the NRC Mitigating Systems Performance Indicator for Safety System Function Failures (SSFF), "The level of judgment for reporting an event or condition under paragraph (a)(2)(v) as an SSFF is a reasonable expectation of preventing the fulfillment of a safety function." Based on this guidance and the above analysis showing the safety function can be reasonably expected to be met within the required period, this event will not be counted as a SSFF.

F. Additional Information

There have been no events at HNP similar to the event documented in this LER in the past three years.