



John R. Dills
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10 CFR 50.73

February 15, 2021
Serial: RA-21-0022

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 2021-002-00

Ladies and Gentlemen:

Duke Energy Progress, LLC, submits the enclosed Licensee Event Report 2021-002-00 in accordance with 10 CFR 50.73 for Shearon Harris Nuclear Power Plant, Unit 1 (HNP). On December 17, 2020, HNP was in Mode 3 and the reactor coolant system was pressurized greater than 1000 pounds per square inch gauge for approximately 15 minutes with all three cold leg injection accumulator discharge valves closed. The cause evaluation is ongoing and this LER will be supplemented following completion of this evaluation. 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 black ink that reads "John R. Dills". The signature is written in a cursive, flowing style.

John R. Dills

Enclosure: Licensee Event Report 2021-002-00

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



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
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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, 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: oir_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 400	3. Page 1 OF 3
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4. Title
All ECCS Accumulator Isolation Valves Closed in Mode 3 With RCS Pressure Greater Than 1000 psig

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name	Docket Number
12	17	2020	2021	002	00	2	15	2021		05000
									Facility Name	Docket Number
										05000

9. Operating Mode 3	10. Power Level 0
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11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	10 CFR Part 73
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	10 CFR Part 21	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
<input type="checkbox"/> 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
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13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to IRIS	Cause	System	Component	Manufacturer	Reportable to IRIS
X	BP	ACC	W351	Y					

14. Supplemental Report Expected

<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)
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15. Expected Submission Date

Month	Day	Year
3	15	2021

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)
On December 17, 2020, with Harris Nuclear Power Plant, Unit 1 (HNP), in Mode 3, Reactor Coolant System (RCS) pressure was being controlled between 900-1000 pounds per square inch gauge (psig) with all three cold leg accumulator (CLA) discharge valves closed. Only one reactor coolant pump (RCP) was available and operating while RCS pressure was being controlled in manual using a pressurizer spray valve (PSV). With only one RCP in operation, pressurizer spray effectiveness was reduced and RCS pressure began rising at 15:35. Operators took immediate actions to arrest the pressure increase by fully opening the PSV, reducing charging flow, and turning off pressurizer heaters. The RCS pressure rise did not stop prior to exceeding 1000 psig. HNP Technical Specifications (TS) require each CLA to be operable in Modes 1, 2, and 3 when RCS pressure is greater than 1000 psig. Since all three CLA discharge valves were closed, this TS requirement was not met for approximately 15 minutes, until pressure was reduced to less than 1000 psig.

Causal factors that led to this event will be determined in the cause evaluation, which is still ongoing. The final results of the cause evaluation will be provided in a supplement to this report.



**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	2021	002	00

NARRATIVE

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

A. Background

On December 17, 2020, Shearon Harris Nuclear Power Plant, Unit 1 (HNP), was in Mode 3 due to a reactor [RCT] trip that occurred on December 16, 2020 at 8:51 eastern standard time (EST). There were no structures, systems, or components that were inoperable prior to the event that contributed to the event. HNP remained in Mode 3 after the event.

HNP Technical Specifications (TS), Section 3.5.1, requires all three Emergency Core Cooling System (ECCS) [BP] cold leg accumulators (CLAs) [ACC] to be operable in Modes 1, 2, and 3 with Reactor Coolant System (RCS) [AB] pressure greater than 1000 pounds per square inch gauge (psig). In order for an ECCS CLA to be considered operable, its motor-operated isolation valve [ISV] must be open. The CLAs are pressure vessels partially filled with borated water and pressurized with nitrogen gas. They are designed to passively inject into the RCS cold legs during a loss of coolant accident (LOCA) when RCS pressure decreases below the nitrogen cover gas pressure. One accumulator is attached to each of the three cold legs of the RCS. During normal operation, each CLA is isolated from the RCS by two check valves [V] in series. In a LOCA, each CLA injects borated water through an open motor-operated isolation valve and two check valves into the RCS. The CLAs are sized so that two of the three CLAs can adequately reflood the core, assuming that one CLA discharges through the LOCA break and into containment [NH].

This event is reportable per 10 CFR 50.73(a)(2)(v)(D), 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."

B. Event Description

Prior to the event, RCS pressure was being controlled in manual using the pressurizer [PZR] spray valve (PSV) for Loop 1 of the RCS, with only the 'A' Reactor Coolant Pump (RCP) [P] in service. The 'A' RCP was the only RCP in service due to the 'B' and 'C' 6.9 kilovolt (kV) auxiliary buses [EA][BU] being de-energized in response to faults on the 6.9 kV non-segregated bus [NSBU] from the 'B' Unit Auxiliary Transformer [XFMR] to the 'B' Auxiliary Bus. These faults resulted in a main generator [GEN] lock-out, which caused an automatic reactor trip on December 16, 2020 at 8:51 EST. Following the reactor trip, HNP was in Mode 3 for an extended amount of time. A control band for RCS pressure of 900 to 1000 psig was established and all three CLA discharge valves were closed with the RCS pressure below 1000 psig, in accordance with procedure guidance for normal plant cooldown from Mode 3 to Mode 5. A plant cooldown to Mode 4 was initially planned, but a decision to remain in Mode 3 was subsequently made.

Due to only having the 'A' RCP available and operating, pressurizer spray effectiveness was reduced. RCS pressure began rising at 15:35. Operators took immediate action to arrest the pressure increase by fully opening the PSV. Operators also reduced charging system flow and turned off pressurizer heaters [EHTR] immediately to arrest the pressure increase. Due to the reduced pressurizer spray effectiveness and the time it takes for heat input from the pressurizer heaters to decay, the RCS pressure rise did not stop prior to exceeding 1000 psig for approximately 15 minutes. RCS pressure reached a maximum of 1010 psig during this time period. Since all three CLA discharge valves were closed, TS 3.5.1 was not met, resulting in TS 3.0.3 entry for approximately 15 minutes, until pressure was reduced to less than 1000 psig.



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Shearon Harris Nuclear Power Plant, Unit 1	05000- 400	YEAR 2021	SEQUENTIAL NUMBER 002	REV NO. 00

NARRATIVE

C. Causal Factors

The cause evaluation is ongoing. Once the evaluation is complete, a supplemental report will be issued containing the causal factors for this event.

D. Corrective Actions

RCS pressure was lowered below 1000 psig to restore compliance with HNP TS 3.5.1. The operators established margin to the RCS pressure limit by setting a conservative control band and eliminated future concerns by reopening the CLA isolation valves. Additional planned actions will be determined following completion of the ongoing cause evaluation.

E. Safety Analysis

The safety analysis for a LOCA initiating from Mode 1 plant conditions credits three ECCS CLAs being available to function to inject borated water into the RCS. For the limiting large-break LOCA case, the safety analysis assumes that the contents of one CLA are spilled through the break, and that injection from the remaining two ECCS CLAs provides replenishment of RCS inventory to provide cooling to the reactor core. However, in consideration of the actual plant conditions at the time of the event, adequate core decay heat removal and RCS inventory replenishment would have been available to successfully mitigate a postulated LOCA with the CLAs isolated. At the time of the event, the plant was in Mode 3 after being in hot standby (Mode 3) for approximately 30 hours following a reactor trip on December 16, 2020, from normal RCS operating temperature and pressure. Given these initial conditions, the decay heat load during the event was lower than the limiting Mode 3 LOCA analysis performed by the Pressurized Water Reactor Owners Group (PWROG) which assumes the CLAs are not available. Furthermore, the PWROG analysis for LOCAs in Mode 3 credits one ECCS subsystem train, consisting of one ECCS centrifugal charging pump, one RHR pump, and one RHR heat exchanger. During the event, both ECCS subsystem trains were operable and available to function to provide injection to the RCS, as required by HNP TS. The availability of RCS injection from a second ECCS subsystem train would provide a risk benefit for the potential consequences of the inability to inject to the RCS from the ECCS CLAs, but is not credited in the deterministic PWROG Mode 3 analysis. In a probabilistic risk assessment (PRA) of the event, it was assumed that all three CLAs were unavailable to inject into the RCS for a 15-minute duration at full power conditions, which bounds the risk impact of this event in Mode 3. The PRA results indicate that this event was of very low risk significance. This condition had no impact on the health and safety of the public.

F. Additional Information

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