



John R. Dills
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10 CFR 50.73

February 16, 2021
Serial: RA-21-0034

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 2021-001-00

Ladies and Gentlemen:

Duke Energy Progress, LLC, submits the enclosed Licensee Event Report 2021-001-00 in accordance with 10 CFR 50.73 for Shearon Harris Nuclear Power Plant, Unit 1 (HNP). On December 16, 2020, with HNP in Mode 1, HNP experienced an automatic reactor trip due to lock-out of the main generator. The 6.9 kilovolt non-segregated bus from the Unit Auxiliary Transformer 1B to the Auxiliary Bus 1B was impacted by faults on the bus.

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 Chuck Yarley at (984) 229-2477.

Sincerely,

A handwritten signature in black ink, appearing to read "John R. Dills", written in a cursive style.

John R. Dills

Enclosure: Licensee Event Report 2021-001-00

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
<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: 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
Automatic Reactor Trip Due to Faults on Non-Segregated Bus From Unit Auxiliary Transformer 1B

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	16	2020	2021	001	00	2	16	2021		05000
									Facility Name	Docket Number
										05000

9. Operating Mode 1	10. Power Level 80%
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11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

<input type="checkbox"/> 10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" 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)	<input type="checkbox"/> 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)	<input type="checkbox"/> 10 CFR Part 21	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input 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)	<input type="checkbox"/> 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 Chuck Yarley, Regulatory Affairs Engineer	Phone Number (Include area code) (984) 229-2477
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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
B	EA	NSBU	S188	Y					

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)				

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

On December 16, 2020, At 08:51, Shearon Harris Nuclear Power Plant, Unit 1 (HNP) experienced an automatic reactor trip due to lock-out of the main generator. The generator lock-out was triggered by phase-to-phase faults that occurred on the 6.9 kilovolt non-segregated bus from the Unit Auxiliary Transformer 1B to the Auxiliary Bus 1B.

Based on forensics and causal analysis, the event was initiated by electrical faults impacting the non-segregated bus within a wall penetration between the Turbine Building (TB) and the Reactor Auxiliary Building (RAB). Degraded bus insulation (Noryl) combined with a medium to conduct the current (water) resulted in faults on the bus. The bus within the penetration is inaccessible and insulation had not been proactively replaced despite known degradation mechanisms. In addition, the installed configuration of the wall penetration did not match the original design and was not being maintained to ensure weather tight characteristics. Bus insulation will be replaced to ensure ongoing insulation integrity and bus penetrations will be restored to design configuration. Further actions will be taken to emphasize lessons learned from the event, including the need to proactively address known issues.



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

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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1. FACILITY NAME Shearon Harris Nuclear Power Plant, Unit 1	2. DOCKET NUMBER 05000- 400	3. LER NUMBER		
		YEAR 2021	SEQUENTIAL NUMBER 001	REV NO. 00

NARRATIVE

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

A. Background

On December 16, 2020, Shearon Harris Nuclear Power Plant, Unit 1 (HNP), was in Mode 1 and in the process of a controlled downpower to perform planned maintenance. At 08:51 eastern standard time, HNP experienced an automatic reactor [RCT] trip due to lock-out of the main generator [GEN]. The generator lock-out was triggered by phase-to-phase faults that occurred on the 6.9 kilovolt (kV) non-segregated bus [NSBU] from the Unit Auxiliary Transformer (UAT) [XFMR] 1B to the Auxiliary Bus [BU] 1B. The trip was not complex, with all systems responding normally post-trip. 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.

This event is reportable per 10 CFR 50.73(a)(2)(iv)(A), as "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B)... [including] Reactor Protection System [JC]...."

The onsite AC non-emergency electrical distribution system [EA] provides auxiliary power to buses which are divided into Trains 'A' and 'B'. Under normal operating conditions, Train 'A' receives power through UAT-1A and Train 'B' receives power through UAT-1B. During start-up and shutdown conditions, offsite power is supplied to Trains 'A' and 'B' through start-up transformers (SUT) 1A and 1B, respectively. The onsite non-emergency electrical distribution includes the 6.9 kV auxiliary buses 1A, 1B, 1C, 1D, 1E, 1-4AA, 1-4AB. Power is carried by six individual bus bars (two per phase), all of which are contained within the same duct enclosure for each bus. This bus arrangement is referred to collectively as a non-segregated bus. The 1B bus supplies non-safety related loads, including the 1B Reactor Coolant Pump [AB] [P] and four secondary pump motors. The 1B bus auto-swapped from UAT-1B to SUT-1B due to the fault.

B. Event Description

The automatic lock-out of the main generator occurred as a result of phase-to-phase faults on the non-segregated bus UAT-1B-X from the UAT-1B X winding to Auxiliary Bus 1B. The phase-to-phase faults occurred in the Reactor Auxiliary Building (RAB) [NF] below the 'B' Switchgear [SWGR] Room and within the nearby bus duct [BDUC] wall penetration [PEN] between the RAB and Turbine Building (TB) [NM]. These faults were the result of phase-to-ground faults that had occurred immediately preceding the phase-to-phase faults, both within the same penetration.

C. Causal Factors

For the faults to occur, two factors were present that together resulted in electrical tracking. Degraded bus insulation [ISL] combined with a medium to conduct the current (water) resulted in tracking on the bus. The degraded insulation was likely a result of cracking in the original bus insulation (Noryl). The site did not implement an adequate long-term strategy to address a known degradation mechanism with original Noryl insulation, particularly in inaccessible bus duct locations. In addition, the installed configuration of the wall penetration did not match the original design and was not being maintained to ensure weather tight characteristics.



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Shearon Harris Nuclear Power Plant, Unit 1	05000- 400	2021	001	00

NARRATIVE

D. Corrective Actions

The site will seal the TB/RAB expansion joint to prevent water from reaching the TB/RAB wall penetration. The eight non-segregated bus penetrations will also be sealed against water and will be restored to match the design configuration. A preventative maintenance strategy will be implemented to periodically assess the wall penetrations. The buses will be inspected and a strategy shall be implemented to ensure bus insulation integrity. Alternatively, the buses can be replaced with cable rated for medium voltage loads. The faulted bus will be repaired. This event will be included in senior leadership training as well as in Electrical Maintenance and Engineering training.

E. Safety Analysis

Upon loss of power from UAT-1B, the power supply was automatically fast transferred from UAT-1B to SUT-1B, maintaining the power supply to the associated safety bus. Loads from UAT-1A were also fast transferred to SUT-1A, as per plant design following a main generator lock-out signal. The trip was not complex, with all safety systems functioning as designed during and following the reactor trip. 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.