



March 10, 2021

L-2021-061
10 CFR 50.73

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Re: St. Lucie Unit 2
Docket No. 50-389
Reportable Event: 2021-001-00
Date of Event: January 20, 2021
Automatic Reactor Trip Due to a Breaker Failure on the 2B2 480V Motor Control Center

The attached Licensee Event Report 2021-001 is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Respectfully,


A handwritten signature in blue ink, reading 'Daniel DeBoer', is positioned above the printed name.

Daniel DeBoer
Site Vice President
St. Lucie Plant

DD/rcs

Attachment

cc: St. Lucie NRC Senior Resident Inspector
St. Lucie NRC Program Manager

NRC FORM 366 (08-2020)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2023					
		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/)								
1. Facility Name St. Lucie Unit 2					2. Docket Number 05000389		3. Page 1 of 3			
4. Title Automatic Reactor Trip Due to a Breaker Failure on the 2B2 480V Motor Control Center										
5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision Number	Month	Day	Year	Facility Name	Docket Number
01	20	2021	2021	001	00	03	10	2021	n/a	05000
								Facility Name		Docket Number
								n/a		05000
9. Operating Mode						10. Power Level				
1						100				
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 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)		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 type="checkbox"/> 50.73(a)(2)(v)(D)		<input type="checkbox"/> 73.77(a)(1)		
<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 in NRC 366A)										
12. Licensee Contact for this LER										
Licensee Contact Richard Sciscente, Licensing Engineer								Telephone Number (Include area code) (772) 467-7156		
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	EC	BKR	S345	Y						
14. Supplemental Report Expected					15. Expected Submission Date			Month	Day	Year
<input type="checkbox"/> YES (If yes, complete 15. Expected Submission Date)					<input checked="" type="checkbox"/> NO					
Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)										
<p>On January 20, 2021 at 1822 EST with Unit 2 in Mode 1 at 100% power, the reactor automatically tripped on Reactor Protection System Loss of Load Actuation concurrent with an unexpected deenergization of the 480V Motor Control Center 2B2. The trip was uncomplicated with all systems responding normally post trip. Operations stabilized the plant in Mode 3. Auxiliary feedwater automatically actuated on the 2A steam generator post trip. Decay heat removal transitioned from auxiliary feedwater to main feedwater through the 2B main feedwater pump to both steam generators and the steam bypass control system to the main condenser.</p> <p>A breaker failure caused two of the four undervoltage relays in the Diverse Turbine Trip system to deenergize to their failed condition creating an unexpected trip path for actuation. The cause of this event was a legacy drawing issue from 1983 that resulted in inadvertently mis-assigning power to two of the four undervoltage (UV) relays to the incorrect train of power when the system was later modified in 2019.</p> <p>The failed breaker has been removed from service, and field configuration of Diverse Turbine Trip relay power supplies was immediately corrected such that the loss of a single power supply will not result in turbine trip.</p> <p>Automatic reactor trips are analyzed events in the Updated Final Safety Analysis Report. The trip was uncomplicated. Therefore, this event had no impact on the health and safety of the public.</p>										

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

(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 Infocollects.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	2. Docket	6. LER Number		
		Year	Sequential Number	Rev No.
St. Lucie Unit 2	05000389	2021	- 001	- 00

NarrativeDescription

On January 20, 2021 at 1822 EST with Unit 2 in Mode 1 at 100% power, the reactor automatically tripped on Reactor Protection System (RPS) Loss of Load Actuation concurrent with an unexpected deenergization of the 480V Motor Control Center (MCC) 2B2 [EC]. A breaker [EC:BKR] failure caused two of the four undervoltage relays in the Diverse Turbine Trip (DTT) system to deenergize to their failed condition creating an unexpected trip path for actuation.

The trip was uncomplicated with all systems responding normally post trip. Operations stabilized the plant in Mode 3. Auxiliary feedwater [BA] automatically actuated on the 2A steam generator post trip. Decay heat removal transitioned from auxiliary feedwater to main feedwater through the 2B main feedwater pump [SJ] to both steam generators and the steam bypass control system to the main condenser.

Cause of the Event

The root cause of this event was that legacy drawings for the undervoltage relay assemblies in the control element drive mechanism control system (CEDMCS) did not conform to St. Lucie Unit 2 train and channel design conventions such that design details including power supply assignments were not clearly defined.

The design of the DTT was expected to withstand the loss of one non-safety-related power supply without resulting in an inadvertent reactor trip. However, a legacy design change performed in 1983 did not update drawings to conform to standardized train and channel design conventions such that design details including power supply assignments were clearly defined on the system drawings. The legacy issue from 1983 resulted in inadvertently mis-assigning of power from two of the four undervoltage relays to the incorrect train of power during the rod control system modification in 2019.

Forensic analysis determined that the failure of the 480V non-safety-related breaker was due to a micrologic trip device defect.

Analysis of the Event

This licensee event report is being reported in accordance with 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)." This event included automatic actuations of the RPS and actuation of the auxiliary feedwater actuation system (AFAS). This event had no significant safety consequence since the RPS and AFAS successfully performed their intended safety function.

Safety Significance

Reactor trip events are described in the UFSAR as anticipated operational occurrences.

The AFAS is designed to automatically respond to a loss of steam generator inventory. Upon the unit trip, the 2A main feedwater pump also tripped on low flow due to its recirculation valve being manually isolated for a previously failed solenoid valve. The steam generator level continued to rise due to seat leakage through the 2B main feedwater regulating valve, eventually reaching trip setpoint for the 2B main feedwater pump. Operators manually placed auxiliary feedwater in service, however the 2A steam generator level was <35% narrow range which, by procedure, limits flow to less than 150 gpm for five minutes. With that limitation on flow, steam generator level did not recover soon enough to prevent automatic initiation of AFAS-1 on low steam generator level. Water level in the 2B steam generator never went below 35% narrow range, so there was adequate feedwater flow to maintain the 2B steam generator level. Main feedwater was always immediately available throughout this event. The Unit 2 UFSAR Table 7.3-12 describes failure modes and effects for the auxiliary feedwater actuation system. This analysis bounds the feedwater observations of the event.

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Narrative

There were no complications, and all safety related systems functioned as designed. There were no safety system actuations other than RPS and AFAS actuations as a result of the event. Given the response of the plant and the plant design that can accommodate this anticipated operational occurrence, the health and safety of the public were not affected by this event.

Corrective Actions

The corrective actions listed below have been entered into the site corrective action program. Any changes to the actions will be managed under the corrective action program.

1. The failed breaker was replaced.
2. The field configuration of Diverse Turbine Trip relay power supplies was corrected such that the loss of a single power supply will not result in turbine trip.
3. Additional corrective actions track improvements to CEDMCS drawings to clearly define the UV Relay Assembly assignment to each power supply.

Failed Components Identified

- 1) 2-40404, Feeder Breaker to the 480V MCC 2B2

Description: Masterpact NT breaker with micrologic 5.0A trip unit

Part Number: NT08N1 with Micrologic 5.0A trip unit (originally supplied in 2009).

Manufacturer: Schneider Electric (Square D / NLI)

Breaker S/N: 064091040005

Trip Unit S/N: 0429027 Sensor Plug Rating: 400A Rating Plug Type: Type A

Similar Events

LER 389-1987-004, Personnel Error Causes Loss of Load Center Resulting in a Reactor Trip (April 20, 1987)