



November 16, 2015

L-2015-281
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: 2015-002-00
Date of Event: September 17, 2015

2A Emergency Diesel Generator Actuation Logic

The attached Licensee Event Report 2015-002-00 is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Sincerely,

A handwritten signature in cursive script that reads "Christopher R. Costanzo".

Christopher R. Costanzo
Site Vice President
St. Lucie Plant

CRC/rcs

Attachment

LE22
NRR



LICENSEE EVENT REPORT (LER)

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, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollections.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.

1. FACILITY NAME St. Lucie Unit 2	2. DOCKET NUMBER 05000389	3. PAGE 1 OF 3
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4. TITLE
2A Emergency Diesel Generator Actuation Logic

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
09	17	2015	2015	002	00	11	16	2015	NA	
									FACILITY NAME	DOCKET NUMBER
									NA	

9. OPERATING MODE
5

10. POWER LEVEL
0%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)

<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<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)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME Richard Sciscente - Principal Engineer, Licensing	TELEPHONE NUMBER (Include Area Code) 772-467-7156
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURE	REPORTABLE TO EPIX
B	EA	NSBU	C770	YES					

14. SUPPLEMENTAL REPORT EXPECTED
 YES (If yes, complete 15. EXPECTED SUBMISSION DATE) NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On September 17, 2015, at 1222 hours, with Unit 2 in Mode 5 at the beginning of a refueling outage, an electrical fault on the 2A 6.9 kV bus resulted in the loss of the 2A startup transformer (SUT) and its associated non-safety related 2A2 and safety-related 2A3 buses. The loss of the 2A SUT actuated the under-voltage relays that would have started the 2A EDG, which had been properly removed from service for preplanned maintenance. The root cause was that the protective boots for a bus bar bolted connection on a vertical riser were not installed (left between bus conductors) during initial plant construction.

Immediate corrective actions included extensive inspections and repair of the remaining vertical portions of this bus. Follow-up corrective actions include performing internal visual inspections of remaining vertical sections of non-segregated buses to ensure that bolted connections have properly installed protective boots.

This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in automatic actuation of an EDG. All safety related systems functioned as designed.

This event had no effect on the health and safety of the public.

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

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
St. Lucie Unit 2	05000389	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	Page 2 of 3
		2015	- 002	- 00	

NARRATIVE

Description of the Event

On September 17, 2015, at 1222 hours, with Unit 2 in Mode 5 at the beginning of a refueling outage, an electrical fault on the 2A 6.9 kV bus resulted in the loss of the 2A startup transformer (SUT) and its associated non-safety related 2A2 and safety-related 2A3 buses. At the time of the event, only the 2B emergency diesel generator (EDG) was required to be in service. The 2A EDG had been removed from service for scheduled maintenance, and did not start. The loss of the 2A SUT actuated the under-voltage relays that would have started the 2A EDG.

Additionally, the 2A train of shutdown cooling (SDC) was de-energized; the 2B (protected) train of SDC was not affected by the event and remained in service to remove decay heat. The 2A shutdown cooling train was restored and made available on September 19, 2015 at 0030. The 2B EDG and 2B SUT were not affected by the event.

During this event, Unit 1 experienced a loss of the 1A startup transformer. There was no other effect on Unit 1 operation, as its associated non-safety and safety-related buses remained powered by the auxiliary transformer. The 1A startup transformer was returned to service on September 18, 2015 at 2103.

Cause

The actuation of the 2A EDG was a direct result of the electrical fault on the 2A 6.9 kV bus. The root cause of the electrical fault was that the protective boots for a bus bar bolted connection, at a vertical riser section, were not installed properly from initial plant construction (legacy human performance error). Over time, contaminants built up on a boot between the "B" and "C" phases, creating a fault path.

Analysis of the Event

On 9/17/15, a differential relay trip of the 1A/2A SUTs occurred separating the "A" train from off-site power. A phase-to-phase fault occurred on the 2A SUT 6.9kV non-segregated bus, between the "B" and "C" phases, that ionized the air in the vicinity of the fault and allowed a phase-to-phase-to-phase event. The initiator of the event was a legacy human performance issue where the protective boots were left off of the bolted connections and placed in between the phases. This allowed the collection of corrosion products over the years to create a path across one of the boots between the "B" and "C" phases.

Safety Significance

This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in automatic actuation of an EDG. The EDG had been previously removed from service and prohibited from starting; however, the actuation logic was satisfied when the undervoltage relays changed state.

The safety significance is minimal because of the preplanned defense-in-depth, the limited cause of the event (improper location of boot) and the prompt actions by station staff, which included restoration of the 2A train of SDC.

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St. Lucie Unit 2	05000389	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	Page 3 of 3
		2015	- 002	- 00	

NARRATIVE

With no complications and all systems responding as designed, the associated risk impact is considered very small. Given the response of the plant and the insignificant risk, the health and safety of the public were not affected by this event.

Corrective Actions

Immediate corrective actions were extensive inspections and repair of the remaining vertical portions of this bus. These inspections included visual inspection, checking bus joint bolt torque, replacing insulating boots and megger testing.

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

1. Perform internal visual inspections of remaining vertical sections of non-segregated buses to ensure that bolted connections on risers have properly installed protective boots.
2. Perform internal inspections on the external buses as part of planned preventative maintenance.

Failed Component(s)

Rectangular Nonsegregated Bus

Manufacturer

Cutler-Hammer