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10 CFR 21.21

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

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Renewed Facility Operating License Nos. DPR-71 and DPR-62
Docket Nos. 50-325 and 50-324
Part 21 Notification - Allen Bradley Model 700RTC Relays

In accordance with 10 CFR 21.21(d)(3)(ii), Duke Energy Progress, Inc., is providing the required written notification of the identification of a defect in Allen Bradley Model 700RTC relays. This information was initially reported to the NRC Operations Center on May 28, 2015 (i.e., Event Number 51095). The enclosure to this letter provides the information required by 10 CFR 21.21(d)(4).

This document contains no regulatory commitments.

Please refer any questions regarding this submittal to Mr. Lee Grzeck, Manager – Regulatory Affairs, at (910) 457-2487.

Sincerely,

William R. Gideon

MAT/mat

Enclosure: 30-Day Notification Per 10 CFR 21.21(d)(3)(ii)

TE19
NRR

cc (with enclosure):

U. S. Nuclear Regulatory Commission, Region II
ATTN: Mr. Victor M. McCree, Regional Administrator
245 Peachtree Center Ave, NE, Suite 1200
Atlanta, GA 30303-1257

U. S. Nuclear Regulatory Commission
ATTN: Ms. Michelle P. Catts, NRC Senior Resident Inspector
8470 River Road
Southport, NC 28461-8869

U. S. Nuclear Regulatory Commission
ATTN: Mr. Andrew Hon (Mail Stop OWFN 8G9A) **(Electronic Copy Only)**
11555 Rockville Pike
Rockville, MD 20852-2738

Chair - North Carolina Utilities Commission
P.O. Box 29510
Raleigh, NC 27626-0510

30-Day Notification Per 10 CFR 21.21(d)(3)(ii)

- (i) Name and address of the individual or individuals informing the Commission.

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- (ii) Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.

Facility:

Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2
Renewed Facility Operating License Nos. DPR-71 and DPR-62
Docket Nos. 50-325 and 50-324

Basic Component:

Allen Bradley Relays Model 700RTC

- (iii) Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.

Allen Bradley manufactured 700RTC relays.

Duke Energy procured the commercial grade relays, dedicated, and installed some of the subject relays in safety related applications at BSEP. The following table provides purchase order numbers, quantities, and date received associated with the affected relays.

Purchase Order	Quantity	Date Received
00782018	3	3/22/2015
00770625	11	1/19/2015
00653664	3	12/19/2012
00416678	3	2/3/2009
00396805	5	10/15/2008

- (iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.

Allen Bradley relays, base model 700RTC, contain an unevaluated Complex Programmable Logic Device (CPLD). This was an unpublished design change that was implemented to replace an obsolete integrated circuit chip. The undocumented design change did not result in a part number change from Allen Bradley. There was no change

to the external appearance of the relay that would indicate that a design change had been made to the relay configuration. Therefore, qualification/dedication of the modified relays has not included additional testing for the new CPLD component. Subsequent testing, performed by Duke Energy, has demonstrated that this CPLD can be affected by electrical noise from operation of connected relays which can reset the timing of the relay.

The details of this unevaluated design change were communicated to the NRC in a letter from AZZ/NLI to the NRC dated April 30, 2015 (i.e., ADAMS Accession Number ML15159A568). This letter indicates that the unevaluated design change was introduced in 2009. However, Duke Energy received similarly affected relays on October 15, 2008.

Affected relays were installed in BSEP's Emergency Diesel Generator (EDG) 3 and EDG 4 during the spring 2015 Unit 2 Refueling Outage. As a result, both EDGs were simultaneously inoperable for a 12-minute period on March 21, 2015. This constituted a loss of safety function of the onsite standby alternating current (AC) power source and was reported to the NRC in Licensee Event Report (LER) 1-2015-002, dated May 20, 2015 (i.e., ADAMS Accession Number ML15149A148).

- (v) The date on which the information of such defect or failure to comply was obtained.

Brunswick site personnel evaluated this condition in accordance with procedure REG-NGGC-0013, "Evaluating and Reporting of Defects and Noncompliance in Accordance with 10 CFR 21." The evaluation was completed on May 26, 2015.

- (vi) In the case of a basic component which contains a defect or fails to comply, the number and location of these components in use at, supplied for, being supplied for, or may be supplied for, manufactured, or being manufactured for one or more facilities or activities subject to the regulations in this part.

The following table provides the location of the affected relays identified in Item (iii).

Purchase Order	Total Purchased	Designation	Location
00782018	3	N/A	None has been installed in the plant
00770625	11	N/A	None has been installed in the plant
00653664	3	2-DG2-SC	EDG 2
		2-DG3-SC	EDG 3
		N/A	Not Installed
00416678	3	1-E1-AF3-63X-1	1A Control Rod Drive (CRD) Pump
		2-E4-AK8-63X-1	2B CRD Pump
		2-DG1-SC	EDG 1

Purchase Order	Total Purchased	Designation	Location
00396805	5	2-DG1-RCR	EDG 1
		2-DG1-RTR	EDG 1
		2-DG3-RCR	EDG 3
		2-DG3-RTR	EDG 3
		N/A	Not Installed

The dedicated relays were not provided to any third party customers.

- (vii) The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.

In response to this event, the following corrective actions were completed.

- EDG 4 was restored to operable status by installation of a non-affected relay.
- EDG 3 was restored to operable status by installation of a transient voltage suppressor (TVS) device in the affected circuit, which eliminated the erratic behavior of the relay.
- Affected relays, not currently installed in the plant, were placed on hold to prevent installation.
- A review of all installed Allen Bradley 700RTC relays was completed. This review was not limited to known, affected Allen Bradley 700RTC relays (i.e., those with CPLDs). The review consisted of an analysis of relevant prints to determine any existing electrical coils (i.e., solenoid, relay, breaker) connected to the 700RTC relay which could result in 700RTC cycling upon coil de-energization. Since there is not a published or documented threshold at which the 700RTC cycling occurs, it was conservatively assumed that any coil could potentially generate enough electrical voltage kickback to result in 700RTC cycling.

The following corrective actions are planned.

- Although the installed relays in EDGs 1, 2, and 4 are not known to be affected by this condition, modifications to install TVS devices in the logic for EDGs 1, 2, and 4 are being performed, as a conservative measure. The EDG 2 modification has been completed. The remaining devices are currently scheduled to be installed by the fourth quarter of 2015. Work Management is responsible for this action.
- Based on the completed extent of condition review, work orders will be generated to test the relays and loads to verify proper operation and check to see if the 700RTC relays are susceptible to inductive kickback in their respective circuits. If the 700RTC is susceptible to the inductive kickback, then a transient voltage suppressor may be installed to prevent cycling. Alternatively, a different relay, not susceptible to inductive kickback, could be used. When the results are collected, engineering

changes will be required to install the TVS devices or to use an alternate relay. Engineering is responsible for this action. The list of relays to be tested is currently scheduled to be compiled by July 3, 2015.

- (viii) Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.

None.

- (ix) In the case of an early site permit, the entities to whom an early site permit was transferred.

This event does not involve an early site permit.