VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

March 9, 2005

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

Serial No. 05-069
NL&OS/ETS Rev. 1
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2
PART 21 NOTIFICATION – IDENTIFICATION OF DEFECT

Pursuant to 10 CFR 21.21.d, Dominion is providing the required 30-day written notification of the identification of a defect. This information was initially reported to the NRC Operations Center on February 10, 2005. During pre-installation testing of Allen-Bradley 700RTC relays, abnormal contact response was observed. The attachment to this letter provides the information requested by 10 CFR 21.21.

This letter does not establish any new commitments. Should you have any questions or require additional information, please contact Mr. Thomas Shaub at (804) 273-2763.

Very truly yours,

Leslie N. Hartz
Vice President - Nuclear Engineering

Attachment

cc: U.S. Nuclear Regulatory Commission
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Attachment

10 CFR 21.21 Notification

Allen-Bradley 700RTC Relays

Virginia Electric and Power Company
(Dominion)
North Anna Power Station Units 1 and 2

Part 21 – Regarding the abnormal response of Allen-Bradley 700RTC relays when configured with the NC contact in the C5-C6 position.

Responsible Officer: W. R. Matthews, Senior Vice President – Nuclear Operation
5000 Dominion Blvd.
Glen Allen, Virginia, 23060

Event Date: February 8, 2005
Unit Name: North Anna Power Station

Component Information (as applicable):
Manufacturer: Allen-Bradley
Part Number: 700RTC11110U1

Description: Abnormal contact response was observed during pre-installation testing of Allen-Bradley 700RTC relays. The 700RTC relays are solid state timing relays used in several Safety Related applications at North Anna. The 700RTC relay provides a wide time adjustment. The relay has two timed contact positions and two instantaneous contact positions. The relays are ordered to a part number that specifies a certain contact arrangement, but the contacts are fully interchangeable and may be configured by the end user in any combination of Normally Open/Normally Closed (NO/NC). Removable contact cartridges mount in the contact slots. At North Anna, Allen-Bradley part number 700RTC11110U1 is used, which is a contact configuration of NO, NC, NO, NC.

The relays were setup and tested in a NO, NO, NC, NC configuration when it was discovered that the instantaneous contact (C5-C6 position), with a NC contact cartridge installed, behaved like a timed contact. The C5-C6 position changed state according to the setting of the timer. All other contact positions worked properly. With a NO contact installed in the C5-C6 position, the contact position behaved as expected (as an instantaneous contact). Different NC contact cartridges were installed in the C5-C6 position of the relay and the anomaly still occurred. Forty-five (45) relays were tested for this anomaly. Twelve of 45 relays failed testing (C5-C6 with NC contact behaved like a timed contact). The relays were returned to Allen-Bradley for failure analysis. Allen-Bradley has duplicated the anomaly using the returned relays and one from their stock. This defect could cause the failure of a safety system to actuate or perform its intended safety function.

The 700RTC relays are used as replacements for Agastat Relays in certain safety-related applications. Over the past twelve years, 700RTC relays have been installed in various locations at North Anna. There are 88 installed timers in two circuits - SBO Diesel and EDG Load Sequencing circuits affecting several plant safety systems. In addition, six timers are installed in the non-safety related instrument air system.

At North Anna, the 700RTC relays are purchased commercial grade then upgraded for safety-related use using the commercial grade dedication process. The upgrade is performed by the North Anna Materials Verification Lab using an approved commercial grade dedication plan. Prior to identification of this anomaly, the dedication testing verified proper contact operation of the contact cartridges in the as-received configuration. The dedication process now verifies proper contact operation in all possible contact configurations.

Current and planned 700RTC relay installations were reviewed. The majority of installed 700RTC relays are configured with the contact cartridges arranged according to the 700RTC11110U1 part number (NO, NC, NO, NC). In a few locations, the contact cartridges are configured NO, NO, NC, NC. North Anna does not utilize the C5-C6 position with the NC contact cartridge in any of 700RTC locations.

Prior to installation, 700RTC relays are bench tested for satisfactory operation.

Causes: Cartridge tolerance is not fully compatible with the relay causing the normally closed instantaneous contact to act as a timed contact. This is generally due to the variation in sensitivity to the eddy currents developed in the relay field poles that operate the contacts. In addition, the contacts do not always have consistent sensitivity, so when their positions are changed there can be incompatibilities between field poles and contacts.

Immediate Corrective Actions: Nine of the relays that failed bench testing were sent back to Allen-Bradley for analysis.

Industry Notification: OE notification No. 19273 - Abnormal response of Allen-Bradley 700RTC relays when configured with the NC contact in the C5-C6 position