



February 5, 2015

Subject: Revision to 10 CFR part 21 Final Notification for Event 50015 for GE CR120 Relays

On April 9, 2014, QualTech NP provided an initial 10 CFR part 21 notification to the Nuclear Regulatory Commission (NRC) concerning failures of General Electric Type CR120AD control relays. This was submitted due to failures of relays that were sent to Nebraska Public Power District (NPPD) as basic components. There were two affected orders, both of which were shipped to NPPD and have since been replaced with relays that have passed supplemental testing designed to identify the infant mortality failure mode described below.

A failure analysis, performed by QualTech NP, revealed that the most likely initiator of the failure was a flaw or defect in the start wrap of the coil magnet wire. The flaw created an arc that involved windings directly beneath the start wrap which resulted in an open circuit on the coil windings. This failure is classified as infant mortality, which appears to be similar to the failure mode identified in the 30 day 10 CFR part 21 report (accession number 9706190261) dated June 12, 1997 submitted by GPU Nuclear.

QualTech NP performed a failure analysis and based on analysis / data provided from the failures found in 2014, considered a 100 hour burn-in test combined with a 100 mechanical cycle test would identify the infant mortality of subject relays. The replacement relays described in the first paragraph of this letter were subjected to this testing.

It has since come to the attention of QualTech NP engineering staff that a similar failure analysis was performed (NRC082495, Revision 1) in response to failures identified at GPU Nuclear Power Plant (Oyster Creek Nuclear Station) as reported in the 30 day 10 CFR Part 21 report issued on June 12, 1997 (Accession Number 9706190261). The test method used to identify this failure mode in 1996 utilized a larger sample size and different testing methodology than was used by QualTech NP in 2014. Given the recent failures by what appears to be a similar mode, QualTech NP engineering staff is updating its recommendation on the testing required for these relays to be in line with the 1997 recommendations.

The test method employed to identify failures included applying ~ 1038 VDC (Voltage Limited) and 49 mA (Current Limited) @ 1cycle / second (50% duty cycle) to a 100% sample size, where a cycle is defined as one second energized and one second de-energized. According to test data, a minimum of 2280 cycles under the above conditions will identify 99.9% of the defective relays without damaging properly constructed relays.

Given the new recommendation by QualTech NP, replacement relays will be provided to NPPD after subjecting them to the new supplemental testing. A full report detailing this test data is available for review upon request ("Approach to Detecting Manufacturing Defect in GE CR120AD03041AA Relays" NRC document NRC082495 Revision 1).

Sincerely,

A handwritten signature in black ink, appearing to read 'M. Thelen', written over a horizontal line.

Matthew Thelen

[mthelen@curtisswright.com](mailto:mthelen@curtisswright.com)

IE19  
MRR