Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

June 19, 2014

CDR-50-391/2014-01
U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

10 CFR 50.55(e)

Watts Bar Nuclear Plant, Unit 2
NRC Docket No. 50-391

Subject: WATTS BAR NUCLEAR PLANT (WBN) UNIT 2 - CONSTRUCTION DEFICIENCY REPORT 50-391/2014-01 – POTENTIAL OPENING OF LITTELFUSE PART NUMBER FLAS005.T FUSES - FINAL REPORT

The purpose of this letter is to provide the final 10 CFR 50.55(e) Construction Deficiency Report (CDR) 391/2014-01 regarding a condition that manufacturer Littelfuse has identified concerning fuses manufactured under three date codes (Part Number FLAS005.T). Littelfuse revised acceptance criteria and a test certificate on April 30, 2014, that resulted in a large increase in the percentage of fuses identified that would potentially be susceptible to nuisance opening. Using this revised criteria, TVA has not identified any fuses used in the construction of WBN Unit 2 that would be expected to separate mechanically. However, until these fuses are replaced on affected Unit 2 systems, the potential exists to have a substantial safety hazard. Initial notification was made on June 3, 2014, via Event Notification No. 50166.

According to Littelfuse, the root cause was determined to be a poor solder joint due to alignment issues related to the assembly fixture. Further details of this condition can be found in Enclosure 1. As corrective action, prior to system turnover to Plant Operations, TVA will remove Littelfuse part number FLAS005.T fuses manufactured under the three date codes identified and replace them with fuses as acceptable for installation. Acceptable replacement fuses will be provided by Littelfuse following certification and acceptance criteria validation.

Enclosure 2 provides the commitments made in this letter.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 19th day of June, 2014.

If you have any questions, please contact me at (423) 365-1260 or Gordon Arent at (423) 365-2004.

Respectfully,

R. A. Hruby, Jr.

Raymond A. Hruby, Jr.
General Manager, Technical Services
Watts Bar Unit 2

Enclosures:

1. Construction Deficiency Report (CDR) 391/2014-01, Potential Opening of Littelfuse Part Number FLAS005.T Fuses
2. List of Commitments

cc (Enclosures):

U. S. Nuclear Regulatory Commission
Region II
Marquis One Tower
245 Peachtree Center Ave., NE Suite 1200
Atlanta, Georgia 30303-1257

NRC Resident Inspector Unit 2
Watts Bar Nuclear Plant
1260 Nuclear Plant Road
Spring City, Tennessee 37381

ENCLOSURE 1

WATTS BAR NUCLEAR PLANT (WBN) UNIT 2
POTENTIAL OPENING OF LITTELFUSE PART NUMBER FLAS005.T FUSES
10 CFR 50.55(e) CONSTRUCTION DEFICIENCY REPORT (CDR) 50-391/2014-01

FINAL REPORT

DESCRIPTION OF DEFICIENCY

TVA identified several Littelfuse part number FLAS005.T fuses that had the blown fuse indicator activated in the warehouse prior to installation on WBN Unit 2. When the indicator is activated, the fuse has opened and needs to be replaced. The fuses were purchased from Littelfuse for use on Unit 2 and were manufactured under three date codes (LOG22F, LOG20F, and LOG28F). The fuses are commercial grade and dedicated by TVA for use as a basic component in safety-related systems. TVA returned 938 fuses to Littelfuse to perform x-ray analysis to detect potential defects in the fuses. In a March 11, 2014, letter, Littelfuse described their inspection criteria and the results of the inspection. There were 1.17% (11 out of 938) of the fuses that had less solder between the spring and resistor than what was considered a sufficient amount. The remaining fuses had a sufficient amount of solder. Based on these results, a statistical analysis was performed by WBN Unit 2 design engineering and WBN Licensing and concluded that there was not a condition reportable under 10 CFR 50.55(e). At that time, TVA determined that the fuses were acceptable for installation. TVA WBN Unit 2 Preoperational Startup personnel began installing the fuses manufactured under the three date codes in WBN Unit 2 safety-related systems after March 11, 2014. Presently, the safety-related systems have not completed preoperational testing required prior to turnover to Operations.

On April 30, 2014, Littelfuse issued a subsequent letter that redefined the acceptance criteria based on its further investigation of the potential manufacturing deficiency. Littelfuse revised the acceptance criteria, "opting to become significantly more selective with regard to products that displayed marginal performance characteristics." The revised criteria resulted in a large increase in the percentage of fuses identified that were potentially susceptible to nuisance opening. From the 988 fuses inspected, 67% were identified with conditions as potentially defective. Littelfuse explained that the revised criteria conditions identify fuses that have the "potential to experience opening due to mechanical separation" and "not all fuses identified using this criteria would be expected to separate mechanically." This condition is conservatively being reported in accordance with 10 CFR 50.55(e). Initial notification was made on June 3, 2014, via Event Notification No. 50166.

No potentially defective fuses have been installed on WBN Unit 1, Sequoyah Nuclear Plant Units 1 or 2, or Browns Ferry Nuclear Plant Units 1, 2, or 3. The issues documented in CDR 50-391/2014-01 are captured in TVA's corrective action program as Problem Evaluation Report (PER) 878252.

CAUSE OF THE DEFICIENCY

On December 5, 2013, Littelfuse completed a Root Cause Analysis. The root cause was determined to be a poor solder joint due to alignment issues related to assembly fixture. The assembly fixture was not appropriate to prevent the condition (broken solder joint between spring and lead). Littelfuse identified two corrective actions: the assembly fixture was to be re-designed to obtain aligned subassemblies, and in-process inspection was to be implemented for subassemblies.

SAFETY IMPLICATIONS

No substantial safety hazard examples have been identified to date.

CORRECTIVE ACTIONS

1. Prior to system turnover to Plant Operations, TVA will remove Littelfuse part number FLAS005.T fuses manufactured under the three date codes identified as potentially susceptible to nuisance opening and replace them with fuses identified by Littelfuse as acceptable for installation after the manufacturer has conducted certification and acceptance criteria validation.

2. As recurrence control, TVA has revised the Procurement Data Sheet to specify that Littelfuse part number FLAS005 fuses purchased in the future require a redesigned assembly fixture to obtain aligned subassemblies, implementation of in-process inspection for subassemblies, and 100% x-ray of fuses for identification of potential defects.

ENCLOSURE 2

LIST OF COMMITMENTS

1. Prior to system turnover to Plant Operations, TVA will remove Littelfuse part number FLAS005.T fuses manufactured under the three date codes identified as potentially susceptible to nuisance opening and replace them with fuses identified by Littelfuse as acceptable for installation after the manufacturer has conducted certification and acceptance criteria validation.