



Rob Johnson  
Quality Manager  
General Cable Corporation  
1600 West Main St  
Willimantic,  
CT 06226

20<sup>th</sup> April 2015

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-001

**Subject: Reply to a Notice of Nonconformance 99900227/2015-201-02**

**Ref: Docket No.: 99900227 Report Number: 2015-201**

Dear Sir/Madam

Based on the results of a Nuclear Regulatory Commission (NRC) inspection conducted at General Cable's facility in Willimantic, CT, on February 2, 2015, through February 6, 2015, certain activities were not conducted in accordance with NRC requirements which were contractually imposed on General Cable by NRC licensees. In accordance with the NRC Requirements, the response to the nonconformance is stated below:

1) Reason For The Noncompliance:

Contrary to Criterion III, "Design Control," of Appendix B, Title 10 of the Code of Federal Regulations (10 CFR) Part 50, General Cable failed to ensure that assumptions from design qualification reports were correctly translated into certificates of conformance sent to their customers. Specifically, certificates of conformance in relation to purchase orders (PO) 00108282 and 00181215, stated in part that, "By virtue of testing performed on the core conductors, cable supplies under PO 00108282 and 00181215 qualifies per Institute of Electrical and Electronics Engineers (IEEE) 383-1974 as Class 1E material. It is also certified that the material supplied meets the requirements of IEEE 323-1974 as tested on the qualification reports F-C5120-1 and F-C5120-3. When used as Class 1E material inside containment, it is recommended that the PVC jacket be removed."

However, the customer required PVC cable jacket was not evaluated or qualified to IEEE 323 or IEEE 383 by General Cable. The certificate of conformance statement did not adequately state the cable's qualified conditions for use which would require the removal of the PVC jacket inside containment (inside containment is an unanalyzed condition). Additionally, there is no statement in the certificate of conformance concerning harsh environments outside of containment which the PVC jacket is also not qualified to be in.

2) Corrective Steps That Have Been Taken:

Cable supplied to Duke Energy meets their requirements. Franklin Qualification Reports F-C5120-1 and F-C5120-3 document the qualification of cable to meet IEEE 323-1974 and IEEE 383-1974. The qualification per the IEEE Standards considered the XLPE insulation. The armor with an overall PVC jacket is used for physical protection as

JE09  
NRO

specified by Duke Energy. The Class 1E qualification of Duke Energy cable is based on the qualification testing of the insulated conductors only. By such means as cable procurement specifications, use restriction design criteria, fault and fire testing, and cable descriptions in station UFSAR and SER documents, the cable was analyzed by Duke Energy to confirm that the cable would perform its function as specified and that it would not place the plant in an unanalyzed condition.

The qualification per F-C5120-1 and F-C5120-3 considers the worst case "harsh" environment that is located inside containment. Other "harsh" areas outside containment would be due to changes in temperature and radiation that would not exceed the inside containment conditions as shown below:

**Normal Conditions**

Temperature	125 °F
Pressure	0 psig
Humidity	20-90% RH
Radiation	2 x 10 <sup>7</sup> Rads γ 40 year

**LOCA (Inside Containment)**

Temperature	350 °F maximum
Pressure	60 psig maximum
Humidity	100% RH
Radiation	Up to 2 x 10 <sup>8</sup> Rads γ TID
Spray	Initial: 2000-2100 ppm Boron 4.0-4.7 pH Recirculation: 1800-2000 ppm Boron 6.0-10.0 pH

**MSLB (Inside Containment)**

Temperature	370 °F maximum
Pressure	60 psig maximum
Humidity	100% RH
Radiation	2 x 10 <sup>7</sup> Rads γ 40 year
Spray	Initial: 2000-2100 ppm Boron 4.0-4.7 pH Recirculation: 1800-2000 ppm Boron 6.0-10.0 pH

**HELB (Outside Containment)**

Temperature	330 °F maximum
Pressure	0 psig
Humidity	100% RH
Radiation	2 x 10 <sup>7</sup> Rads γ 40 year
Spray	None

The statement below was approved by Duke Energy on March 8, 1993 for use on General Cable Certified Test Reports (CTR) to account for the use of PVC jackets.

“By virtue of testing performed on the core conductors, cable supplied under P.O. \_\_\_\_\_ qualifies per IEEE 383-1974 as Class 1E material. When used as Class 1E material inside containment, it is recommended that the PVC jacket be removed.”

Per Duke Energy design criteria, the Catawba and McGuire facilities require the removal of existing PVC jackets from the cable armor prior to installation in the Reactor Buildings/Containment. One opening statement from Duke Energy documents states: “The use of jacketed cables is restricted in order to limit the quantity of combustible materials within the plant and structures.” The Oconee facility does not require the removal of the PVC jackets from the armored cable prior to installation in the Reactor Buildings/Containment because all Units of that station were already commercially operating before the 1975 Browns Ferry fire event. The use of the PVC jacket over armor has been justified by Duke Energy. The insulated conductors are qualified by F-C15120-1 and F-C5120-3.

Prior to March 8, 1993, there was no “recommended removal” statement in the CTR certification. Duke Energy requires the removal of the PVC jacket over armor for combustible material concerns due to the Brown’s Ferry fire and not due to qualification. The removal/non-removal of the PVC overall jacket has been justified by Duke Energy.

3) Corrective Steps That Will Be Taken:

The qualification per F-C5120-1 and F-C5120-3 qualifies insulated conductors to meet IEEE 323-1974 and IEEE 383-1974 is considered acceptable for the intended application.

The use/non-use of the PVC jacket over armor has been justified by Duke Energy analyses involved with cable procurement specifications, use restriction design criteria, fault and fire testing, and cable descriptions in station UFSAR and SER documents. Currently, all CTR certifications have the statement, “When used as Class 1E material inside containment, it is recommended that the PVC jacket be removed.” The “recommended removal” statement has no effect on the environmental qualification of the cables or licensing documents of Duke Energy.

By agreement between General Cable and Duke Energy all CTRs issued in the future shall instead state:

“By virtue of testing performed on the core conductors, cable supplied under P.O. \_\_\_\_\_ qualifies per IEEE 383-1974 as Class 1E material.”

4) Date When The Corrective Action Will be Completed

The target date for full compliance is 30<sup>th</sup> April 2015.

Please let me know if you require any further clarification.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'R. Johnson', with a long horizontal line extending to the right.

R. Johnson  
rxjohnson@generalcable.com

cc. Chief, Electrical Vendor Inspection Branch, Division of Construction Inspection and Operational Programs, Office of New Reactors