

## **IEEE Standards Interpretation for IEEE Std 383™-1974 IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices and Connections for Nuclear Power Generating Stations**

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### **Interpretation Request #1**

**Relevant Clause:** Subclause 2.3.2 (Aging Data) to 2.4.4 **Topic:** Long term physical aging properties

Which way should the test be conducted? Should [we] age the complete cable sample or should the insulated conductors be taken out of the cable? In general, the cables selected as samples for qualification must be representative of the family of cables being qualified and of installed configurations. This may require that individual insulated conductors, multi-conductor jacketed cables or jacketed single conductor cables be part of the test program. Both aged and unaged samples should be selected. These samples will be required to be exposed to thermal aging, radiation aging, DBE conditions, and to pass post DBE tests.

### **Interpretation Response**

Long term physical aging is thermal aging, and aging times should be determined based on the material properties utilized in the construction of the cable. Accelerated aging may need to be part of the test program, if naturally aged samples cannot be obtained. If accelerated aging is employed, the Arrhenius technique should be used to establish aging times and temperatures. It may be necessary, and desirable, to perform accelerated tests on both the completed cable and individual insulated conductors. The insulated conductors will need to be aged to their end of life condition. Aging of the completed cable is particularly important if the cable has a bonded jacket.

### **Interpretation Request #2**

**Relevant Clause:** Subclause 2.4.2 to 2.4.4 **Topic:** Radiation Exposure - Total

Cable or insulated conductor from cable?

### **Interpretation Response**

Whatever samples are selected for thermal aging should continue through the radiation exposure and the remainder of the test program.

### **Interpretation Request #3**

**Relevant Clause:** Subclause 2.4.3.2

The word "Cable" is appearing. Does it mean the cable is subjected to LOCA?

### **Interpretation Response**

Yes, the cable (test samples) are subjected to LOCA conditions.

### **Interpretation Request #4**

For radiation exposure and LOCA rest whether the specimens are insulated cores taken out of the cable or the complete cable is subjected for the test of radiation exposure. What is the practice please?

### **Interpretation Response**

The Nuclear Power Engineering Committee (NPEC) is unclear what the specific question is. NPEC can interpret the question one of two ways.

Should the copper conductor be removed leaving a hollow insulated tube (core) or should the conductors remain within the insulation for the test? The cable should be tested with the conductor in the cable or insulated conductor. If the conductor is removed from the cable, it will no be possible to demonstrate the cable will function electrically.

Should the test samples (insulated single conductors, complete multi-conductor cable, jacketed single conductor cable, etc.) be exposed to radiation and LOCA conditions of the test? Whatever samples are selected for thermal aging should continue the radiation exposure and the remainder of the test.

### **Interpretation Request #5**

Does the word "Specimen" in Cl 2.4.4 refer to the cable or conductors removed from the cable?

### **Interpretation Response**

The specimens are the samples that have gone through the test program. These could be both individual insulated conductors and/or completed cables.

### **Interpretation Request**

Are there additional references to any International standards for carrying out these tests for Class 1E cables?

**Interpretation Response**

NPEC is not aware of a similar International standard, hence no guidance is provided in this area.