Arc Resistant Switchgear Tested to ANSI C37.20.7 and NFPA70E

The intent of the 2004 version of NFPA70E, *Standard for Electrical Safety in the Work Place*, is to minimize the “at-risk” procedures used by operators of electrical equipment. The first step is to minimize risk by having operators perform work with the equipment only in an electrically safe condition, the second step is to design the hazard out of the normal work procedures, and the third step is to rely on Personal Protective Equipment to minimize the risk to the individual performing the task.

Arc resistant switchgear can assist with the first step effort by providing enhanced safety conditions when the operator task involves energized equipment and possible exposure to an arcing fault. Tasks in this category include:

- Racking a medium voltage circuit breaker to or from the bus connected position
- Racking a VT or CPT roll-out to or from the bus connected position
- Opening and closing a circuit breaker
- Calibrating and troubleshooting devices within the instrument compartment

The purpose of arc resistant switchgear certified to ANSI C37.20.7 is to eliminate the risk from the arc blast and the by-products (heat, pressure, shrapnel, and molten copper) during normal tasks performed on the equipment. During arc fault design tests the energy release by an arcing fault is monitored by mounting racks of a black cotton material in panels covering the surface of the switchgear. This material is similar to 4.5oz/yd untreated t-shirt material identified as Hazard/Risk Category 0 per NFPA70E Table 130.7(c) (11). The panels are mounted at 3.9 inches from all possible seams and one of the many acceptance criteria of ANSI C37.20.7 is that none of the cotton indicators ignites during or following a test.

While the focus of NFPA70E is the heat from the arc in medium voltage switchgear, it is the pressure wave associated with the arc fault that dictates the design of the switchgear. The switchgear designed for arc resistant protection requires heavy reinforcing of the entire structure.

In conclusion, arc resistant switchgear designs the hazard out of the tasks and reduces the level of risk for normal tasks to a zone 0 category. The result is a reduced need for PPE. The design focus of arc resistant switchgear is to provide the necessary enhanced safety features while requiring no addition maintenance, calibration, or final element tests to assure functionality.

Jim Bowen
Technical Director