

Blackouts and Brownouts in Heat Wave Underscore Importance of Transmission Technology Embodied in 3M's ACCR

Lightweight Aluminum Conductor Composite is Heat-Sag Resistant and Proven Under Harsh and Varied Climates; Addresses Problems Threatening Grids

Power disruptions related to peak-demand loads during intense heat waves are prompting utilities around the world to examine new technologies to make power grids more efficient and reliable - including 3M's breakthrough transmission line, the 3M Aluminum Conductor Composite Reinforced (ACCR), which already is in use by major utilities throughout the United States.

Developed with the support of the U.S. Department of Energy (DOE) and field tested exhaustively under a wide range of harsh climatic conditions, the 3M ACCR is a lightweight overhead conductor that provides more than twice the capacity of conventional steel lines of the same diameter without requiring new towers or additional rights of way. 3M ACCR also resists heat sag - the major cause of transmission bottlenecks that result in brownouts and blackouts.

"3M ACCR is playing an expanding role in helping utilities plan for greater reliability and fewer disruptions," says Tracy Anderson, who heads 3M ACCR business development unit. "It is proving to be a fast and cost-effective solution for alleviating transmission constraints in areas that experience trouble during peak demands."

Seven major U.S. utilities are using 3M ACCR lines commercially or are in the process of installing them in regions as diverse as the desert Southwest, the humid Gulf states and the often sub-zero northern plains. Currently, Arizona Public Service is using 3M ACCR to ensure a reliable supply of power to the congested Phoenix business district; Salt River Project is operating the conductor at high current loads at the Santan Expansion; and Xcel Energy uses the conductor to provide critical interconnection of a peaking plant in Minneapolis.

"After years of rigorous field testing in a variety of harsh environments and an additional two years of commercial experience under our belts, the conductor and accessories continue to perform as expected without any problems or field failures," says Anderson. "3M ACCR was developed with a focus on reliability from the choice of chemically compatible materials used in the conductor to the inherent redundancy on strength that occurs from having a multistrand core surrounded by full strength aluminum zirconium."

3M ACCR strength and durability result from its aluminum oxide (alumina) fibers, which are embedded in the high-purity 3M aluminum matrix core wires, utilizing a highly specialized and patented process. The constituent materials are chemically inert with respect to each other and can withstand extreme temperatures without chemical reactions or any appreciable loss in strength.

Tests of 3M ACCR at Oak Ridge National Laboratory demonstrated the conductor's integrity after exposure to temperatures even higher than the rated continuous operating temperature of 210 degrees Celsius - a significant safety factor. Because of its aluminum base, the conductor is not adversely affected by environmental conditions, such as moisture or ultraviolet exposure.

Due to its strength, reduced weight and lower thermal expansion characteristics, 3M ACCR can be used to quickly double the capacity of an existing line without exceeding the sag limits or the mechanical limits of the existing towers. As a result, the towers can be preserved, often without any visual change to the line.

3M holds 14 patents related to this new technology. 3M ACCR has been recognized by R&D Magazine with an R&D 100 Award as one of the most technologically significant products introduced into the marketplace and by the Minnesota High Tech Association with a Tekne Award for innovative development. In addition, 3M ACCR was one of the technologies that President George W. Bush viewed during a recent visit to 3M.

More information about the 3M ACCR is available at www.3M.com/accr.

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