

Major Utility in Southern U.S. Upgrades Transmission Lines with 3M ACCR to Avoid Wetlands Tower Construction

Project Doubles Ampacity on 16.7-Mile Segment Linking Generating Plants;
Requires Minimal Outage Time or Changes to Existing Infrastructure

Georgia Power, a subsidiary of Southern Company, one of the nation's largest electric utilities, has chosen the lightweight, low-sag 3M ACCR overhead conductor to double transmission capacity on a set of lines that cross extensive wetlands near Savannah. The upgrade significantly reduces the need for larger towers or a wider right of way, thus avoiding a range of potential challenges, including construction on environmentally sensitive land.

Based in Atlanta, Southern Company serves more than 4.4 million residential, commercial and industrial customers in four states. Georgia Power is its largest subsidiary.

The upgrade is on a 16.7-mile line linking the Kraft generating plant in Savannah with its McIntosh plant north of the city. The project resolves potential capacity issues by approximately doubling the 230kV double circuits' line capacity, replacing a conventional steel core conductor with a [3M ACCR](#) 1622 kcmil conductor that is light enough to be accommodated mostly by the existing infrastructure.

After studying a number of options and considering the capacity increases achievable; the costs of structures, construction and permitting, and conductor costs, Georgia Power chose ACCR as the most cost-effective option.

Bob Beck, Southern Company Services Senior Transmission Planner, cited three issues that confronted the upgrade project: right-of-way expansion was not feasible, wet terrain made tower construction very expensive and environmentally problematic, and construction outages were limited to light-load periods.

"3M ACCR enabled us to use mostly existing towers and to re-conductor with minimal disturbance to the land and no service interruption," he said.

In 2013, the company is completing a similar project with 3M ACCR to further enhance area reliability.

3M ACCR's composite core is as strong as steel, but lighter, and its coefficient of thermal expansion is half that of steel.

Tim Koenig, director of 3M's High-Capacity Conductor program, notes, "Utilities around the globe are recognizing 3M ACCR as a proven solution to electric transmission constraints that is both cost-effective and applicable to a very broad range of climate conditions and terrain. Most important, it offers a means of quickly making more power available in response to growing demand without the financial and environmental risks associated with enlarging towers or expanding rights of way."

Koenig also observes that 3M ACCR is helping utilities meet new demands being placed on electricity grids without encountering costly and problematic construction, right-of-way expansion or permitting issues.

3M ACCR was developed with the support of the U.S. Department of Energy, which tested the conductor at its Oak Ridge National Laboratory (ORNL) in Tennessee, and with early contributions by the Defense Advanced Research Projects Agency. The ORNL tests demonstrated that the conductor retains its integrity after exposure to temperatures even higher than the rated continuous operating temperature of 210 degrees Celsius and the

emergency operating temperature of 240 degrees Celsius. It has the durability and longevity of traditional steel core conductors, even when operated continuously at high temperatures.

The conductor's strength and durability result from its core, composed of aluminum oxide (alumina) fibers embedded in high-purity aluminum, utilizing a highly specialized and proprietary process. The constituent materials can withstand high temperatures without appreciable loss in strength.

Also, since 3M's ACCR is based on aluminum, it has the corrosion resistance typically associated with all-aluminum conductors.

3M holds several patents on its ACCR technology, which 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.

The [3M Electrical Markets Division](#), based in Austin, Texas, designs, manufactures and markets products for electrical construction, industrial maintenance, utility and industrial power, and electrical and electronic components. EMD has more than 60 years of experience serving customers with highly reliable products, including electrical and electronic insulating tapes and papers; electromagnetic compatible products; power cable splices and terminations; high-temperature, low-sag transmission conductors; heat shrinkable tubing and molded shapes; electrical wire connectors, terminals, tools and lugs; wire marking products; cable ties; and electrical diagnostic and detection products.

More information about the 3M high capacity conductor is available at www.3M.com/accr.

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3M Public Relations Colleen Horn Harris, 651-733-1566 or LVM Group Inc. Bob Rumerman, 212-499-6567 bob@lvmgroup.com or Rachel Antman, 212-499-6570 rachel@lvmgroup.com

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