

# POWER SOURCE

A Corporate Publication of Santee Cooper

WINTER 2004

*Reliability: More Than  
Just Keeping the Lights On*

**Showa Denko: Helping Melt Steel Worldwide | Electric Safety Begins with You | Children's Museum: a Hands-On Experience**

# RELIABILITY: Helping Meet Expectations....

Life is full of expectations. In fact, it is fulfilled expectations—both technical and personal—that translate into various levels of satisfaction. We flip a switch and the lights come on. We turn a faucet and water flows. We pick up the telephone and there is a dial tone. We expect our children to return home safely from school. We expect courteous treatment when we call a utility. We expect our paychecks to be delivered on time, and we expect our families to accept us as we are. In each case, we expect that a particular service will be delivered or that individuals and organizations will respond in expected ways.

We know that our customers expect reliable service. They flip a switch, turn a dial or depend on an automatic device such as a thermostat or photosensor to provide a flow of power that performs some particular task. In each instance, their expectations are normally met and an experience of satisfaction is achieved. For Santee Cooper, reliability is a major part of our brand. It's all about dependability. We pride ourselves in delivering dependable power with dependable people. It's an integral part of our brand.

Delivering electric power is a unique achievement. Electricity is the only product or service—it is really both—that is manufactured, delivered and used in the same instance. There is no way to store a needed supply of electrons, so when you flip a switch, the “order” goes out for a flow of power and an electric generator somewhere speeds up enough to meet your demand. The power is generated, flows through transmission and distribution lines and is delivered to meet your specific need. It's all instantaneous and provided on a continuous, uninterrupted basis. As a result, the lights are on, the TV informs and entertains, heating and cooling systems maintain comfort conditioning, and life goes on with a quality that meets our most demanding expectations. It's a reliable service that—like many relationships—can be taken for granted. According to surveys, reliability ranks as the most important attribute of the services provided by electric utilities. In fact, customers rank it ahead of cost of power, frequency of interruptions, customer service, community outreach and other matters.



T. Graham Edwards  
Chairman — Board of Directors

“Just call my name and I'll be there,” are the compelling lyrics in a popular Jackson Five song. Ironically, those same words echo the essence of electric reliability. Just flip the switch, turn the dial, or push a button and electricity will be there. That's the core message of the article on reliability in this issue of PowerSource. I hope it helps you understand why all aspects of reliability—generation, transmission, distribution and customer service—are so important to Santee Cooper and to the customers we serve and why we strive to meet their expectations every day.



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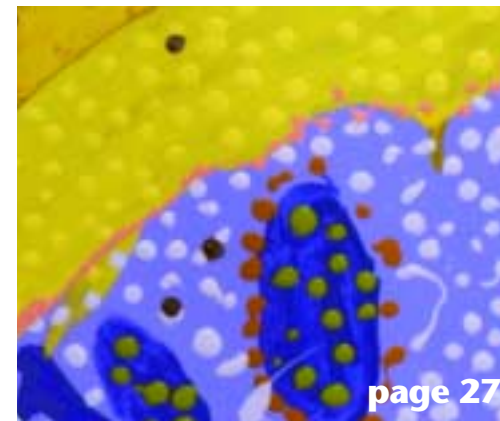
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Winter 2004 — Vol. 4, No. 1  
PowerSource is published by Santee Cooper  
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Cover: An illuminating reminder of the reliable flow of Santee Cooper power to a home in Pinopolis S.C.

Printed on recycled paper.



# ELECTRIC RELIABILITY: IT DOESN'T JUST HAPPEN

**It's the product of Planning, Perspective, Prudent Management and Providing the Right Resources to do the Job. It's an Effort where Dependable Power is the product of Dependable People.**



*Starting at about 4:11 p.m. EDT on Aug. 14, major losses of electric load occurred in the Northeastern U.S. and Canada. Although the exact cause is not known at present, the outages are not the result of a physical or cyber-terrorist attack. Investigations and data collections continue...*

—North American Electric Reliability Council  
press release of Aug. 14, 2003



Last year's massive power blackout in the Northeast and Midwest affecting 50 million people in six states and Canada brought into sharp focus how critical it is for any electric utility to maintain a strong system.

The reliable flow of power evolved in the 20th century not as a luxury of modern human existence, but a necessity—as basic as food, water, shelter and clothing.

The question is: Could this happen in South Carolina, where Santee Cooper is the direct and indirect power source for 1.8 million of the state's 4.1 million people?

"It's very unlikely that something like that would occur here,"

says Bill McCall, Santee Cooper's executive vice president and chief operating officer.

"Up North, they transmit power over much longer distances. Our generation and transmission system is close to our electrical loads and that makes for a more reliable system."

Santee Cooper meets the electrical needs of its customers by approaching this gargantuan task in a step-by-step process.

**Left:** Greenwood County Switching Station, where Santee Cooper interconnects with Duke Power.

**Above:** Bill McCall, executive vice president and chief operating officer, in Santee Cooper's Energy Control Center.



## Reliability Begins with Planning

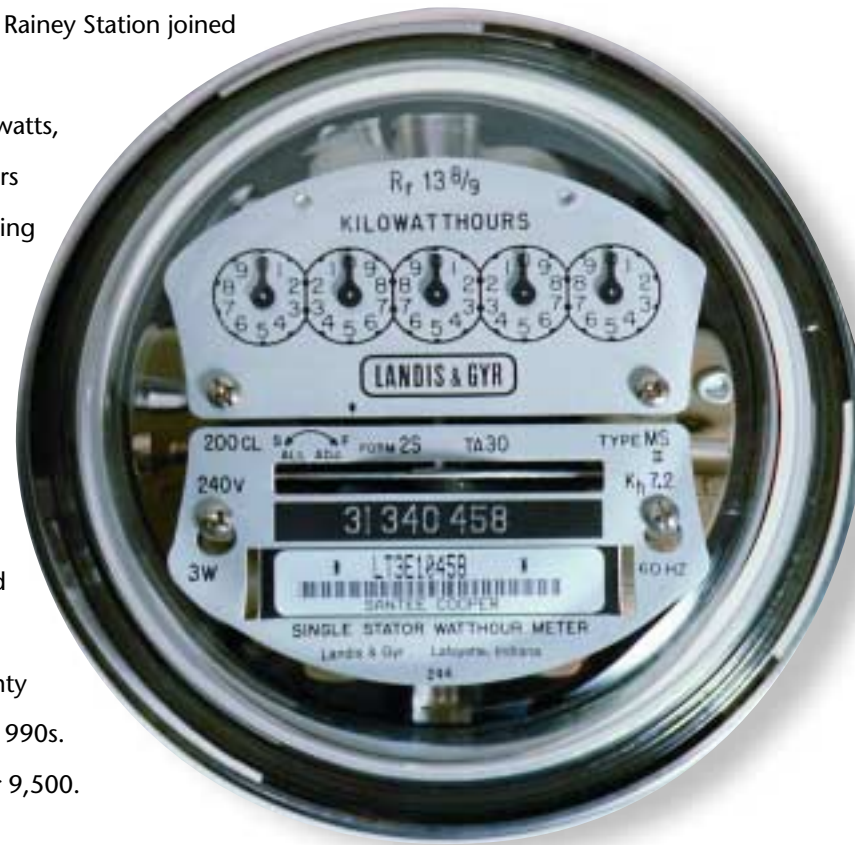
“Reliability starts with planning,” McCall says simply. “You must keep up with your load, and Santee Cooper’s load has grown a fair amount over the last decade or so. For example, in 1993, Santee Cooper had the ability to provide about 3,100 megawatts of power. Today, we can provide nearly 5,100 megawatts. To meet those increasing demands over the last 10 years, we’ve added an additional 620 megawatts at the Cross Station, built an entirely new station—the Rainey Generating Station in Anderson County, and added Green Power. Also, another unit similar to the two already at Cross is planned for operation by 2007.”

Located in western Anderson County, the Rainey Station began commercial operation with 500 MWs on Jan. 1, 2002, with two additional 170-MW units entering service the following five months. On Jan. 1, 2004 three more natural gas-fired generating units producing a total of 240 MWs at the Rainey Station joined Santee Cooper’s lineup.

“That station can now produce over 1,000 megawatts, power Santee Cooper didn’t have a little over two years ago,” says McCall. “We need that power for our growing population here in South Carolina.”

According to the U.S. Census, the state’s population grew 15 percent, or just over 525,000, from 1990 to 2000. But the most dramatic growth occurred in Berkeley, Georgetown and Horry counties, Santee Cooper’s direct service territory.

As one would imagine, explosive growth occurred in Horry and Georgetown counties, where the Grand Strand was nothing short of a boomtown. Horry County grew 36 percent, adding 56,000 more people in the 1990s. Georgetown County’s population grew 21 percent, or 9,500.



*Routine maintenance helps maintain high reliability. Santee Cooper line crew performs work on a transmission line near Overton.*



While Berkeley County’s growth was less, 11 percent or 14,000 new residents, these compelling growth figures put added pressure on electric utilities to have the power when the customer flips a switch.

“When building generation,” McCall says, “you have to get the power to where it’s needed. Santee Cooper will be spending \$35 to \$50 million annually on transmission lines in the coming years.”

In 1993, Santee Cooper had 3,967 miles of transmission lines. Today, that

figure is 4,424 miles of lines, the super-highways of electrical lines that carry massive amounts of power to substations and ultimately, the end-user in homes, businesses and factories.

“Reliability is designed into the planning and operations of Santee Cooper’s transmission system such that the loss of any line will not adversely affect the remaining system or our load,” explains Terry Blackwell, senior vice president of transmission.

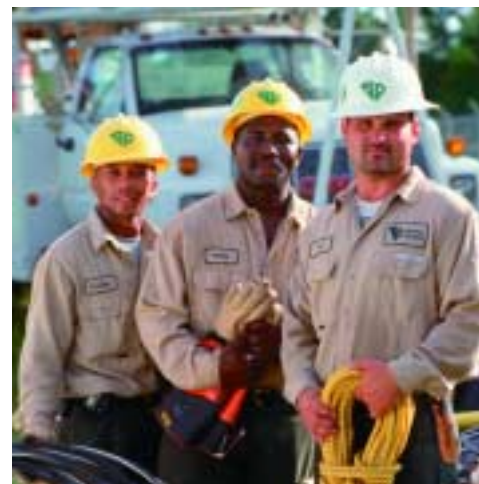
“Ten years ago, we had 260 electrical delivery points to provide power to 15 of the state’s 20 electric cooperatives,” says McCall. “In 2001, Santee Cooper became the primary source of power for the remaining five co-ops in the Upstate. Now, we have 326 co-op delivery points. Another important thing is that you must plan your interconnections with other utilities. For example, when we begin planning to add another generating unit, we share those plans with other utilities. This is important because we have 17 interconnections with other utilities in our region.”





**Right:** A natural gas-fueled combustion-turbine generating unit starts up at Rainey Station in Anderson County.

**Below:** A Santee Cooper distribution line crew.



## Operating & Maintenance Efficiency Keeps Power Flowing

McCall says the next step in the road to reliability after a system is planned and built is how it's operated. Generation must match load. When maintenance on a line is required, the line isn't taken out of service unless a backup is in place.

"We've done a pretty good job, particularly on the maintenance side of our transmission system," says McCall. "We do aerial surveys of our lines and annually walk them, conducting visual surveys. We do tree trimming on transmission and distribution rights of way. We're mindful of the environment, but limbs getting into power lines do cause problems."

*And just how reliable is Santee Cooper's generation, transmission and distribution system? For example in 2002:*

- Santee Cooper's five large-scale generating stations in Anderson, Berkeley, Georgetown and Horry counties were available 94.02 percent of the time. The national average is about 87 percent.
- Santee Cooper's transmission system availability was 99.997 percent.
- Santee Cooper's distribution system availability to retail customers in Berkeley, Georgetown and Horry counties was 99.994 percent. This figure includes outages due to weather or mechanical breakdowns.

Diversity in the power supply is important so that all of Santee Cooper's generation eggs aren't in one basket or dependent on one type of fuel to make reliable electricity.

Santee Cooper was all hydroelectric from its first power flow in 1942 until 1954. Today, the generation mix is much different. At the end of 2002, coal accounted for about 57 percent of Santee Cooper's capability, 21 percent was natural gas and oil, 7 percent was nuclear (one-third ownership in the V.C. Summer Nuclear Station), just less than 3 percent was hydroelectric and about 12 percent came from the federal Southeastern Power Administration, U.S. Army Corps of Engineers and purchased power.

"The recent drought is a good example of why it wouldn't be good if we were still 100 percent hydro," says Maxie Chaplin, senior vice president of generation. "We had to cut back on that type of generation because there simply wasn't enough water in the Santee Cooper Lakes. It's just good to have other sources of power if you need them."

No electric utility can guarantee power from one minute to the next. And when outages do occur, responding quickly after a typical thunderstorm or a savage hurricane, keeps a utility in the good graces of its customers.



Customer Service Representative Michelle Snelling.



### **Good Customer Service is Key Reliability Factor**

“Customer expectations are higher than ever,” said Zack Dusenbury, vice president of Retail Operations. “That’s one of the reasons we will continue to work hard to keep our record of reliability and customer satisfaction high.”

“We work with the industries we serve, meeting with them, our co-op counterparts and with the Santee Cooper Customer Advisory Council which provides valuable input on what we’re doing right and about things we could do better,” McCall says. “I’m very proud of our employees. Our folks are as dedicated to Santee Cooper as they would be if it was their own company. It shows how much they care.”

“Keeping a distribution system in good shape requires good personnel, and we’ve got them,” says Furman Williamson, manager of distribution services. “Our training, up-to-date equipment and an eye constantly focused on job safety provide an employee with the needed tools to run a reliable distribution system. We’ve got those tools here.”

Says McCall, “Santee Cooper is a reliable generator, transmitter and distributor of electric power critical to our economy and standard of living. We will continue to meet the needs of a growing South Carolina with power that is not only reliable, but affordable to those who depend on Santee Cooper 24 hours a day, seven days a week.”





## SHOWA DENKO CARBON INC.— HELPING MELT STEEL WORLDWIDE

*Within the industrial complex, an around-the-clock operation brings petroleum and coal-based raw materials together in a multi-step process to produce graphite electrodes for use by many of the steel industry's electric arc furnaces in more than 100 countries worldwide.*

Ridgeville, S.C. is a quiet rural crossroads community of less than 1,700 residents, yet it has the claim to fame of being home of the most modern graphite electrode production plant in the world. Getting there, you drive past Duke's Barbecue, the town's most popular eatery and gathering point, cross the railroad tracks, zigzag onto tree-lined Ridge Road, and before you know it, you're driving through beautiful countryside. Suddenly on your right is the flag-adorned entrance to the Showa Denko Carbon plant.

Showa Denko Carbon specializes in manufacturing large diameter, ultra-high-power (UHP) graphite electrodes for the electric arc furnace steel companies all over the world. It is the latest, fully-integrated electrode plant constructed in North America.

Showa Denko Carbon Inc. (SDKC) was formed in 1988 when Showa Denko K.K. of Tokyo, Japan purchased the South Carolina Graphite Works from Airco Carbon. Airco Carbon had its beginning in St. Marys, Pa. in 1889 as Speer Carbon Co.

Construction began on the Airco Carbon plant two miles west of Ridgeville in February 1982. The first finished electrodes were shipped in October 1983.



**Left:** Carbon electrodes stacked up at Showa Denko Carbon — ready for shipment.

**Above:** President and Chief Executive Officer Steve Ulmer.

By focusing its efforts on a single product line of large-diameter UHP electrodes, the Ridgeville plant has developed a solid reputation for quality, reliability, service and a significant market share.

“The key element of our success is integration of our modern mill, mix and extrusion equipment,” says President and Chief Executive Officer Steve Ulmer, a 40-year veteran of the electrode industry. He points out that, unlike other newer facilities, SDKC processes raw materials in a single, modern installation. “What that means to our customers is that we focus solely on producing consistent, high-quality electrodes month-to-month, season-to-season and year-to-year.”

*A carbon electrode is extruded and cut to length.*



## Using Electrodes to Make Steel

Ulmer says the primary customer for manufactured graphite electrodes is the steelmaking industry. Over 900-million metric tons of steel are manufactured annually worldwide in over 100 countries.

Steel is made in either integrated mills where iron ore is reduced to liquid iron in blast furnaces then converted to steel in basic oxygen furnaces, or in minimills where electric arc furnaces (EAF) use large amounts of electricity to melt scrap steel to liquid steel.

Over 35 percent of the steel produced worldwide each year is poured from electric arc furnaces. EAF steelmaking accounts for approximately 50 percent of steel produced annually in the United States. Many specialty steels, like stainless steel, are produced only in electric arc furnaces. Graphite electrodes serve as the means or path for transporting electrical energy from the power lines into the electric arc steel-making furnace.

Ulmer points out that the greatest growth of steelmaking has been in the minimill sector, which uses electric arc furnaces to recycle scrap metal into new product.

In the EAF steel-making process, the solid cylinders of graphite, weighing anywhere from 1,000 pounds to over two tons apiece, conduct up to 160,000 amperes of electricity into the furnace. This electricity flows through an arc or arc plasma that extends from the tip of the electrode to the steel scrap or bath of molten steel. With temperatures between 13,000 to 14,000 degrees Centigrade, the arc is the source of energy used to melt the scrap steel or iron metal and also furnishes the energy needed for refining the steel to its final chemistry.



*More than 140-million watts of Santee Cooper power flow through the carbon electrodes at Nucor Steel's plant in Berkeley County.*

## Showa Denko Carbon's Graphite Rods

“Graphite is the ideal material for electrodes used in steelmaking because of its unique physical properties,” explains Ulmer. “It has good strength at extremely high temperatures, relatively good resistance to oxidation and it is a good electrical conductor.”

Graphite is the only material that can withstand the ultra-high temperatures and thermal and mechanical stresses present within electric arc furnaces, Ulmer explains. About 1 million metric tons of electrodes are consumed worldwide each year in electric arc furnaces. Showa Denko Carbon is in the forefront of producing and supplying the needs of this unique and essential material.

Graphite electrodes conduct electricity to form an electric arc of intense heat, where other conductors would simply melt. As the carbon is consumed, it is transformed directly from solid to gas, combining with oxygen to form carbon

dioxide. The molten steel remains all steel without being contaminated by any metals or substances that would result from a melting metallic electrode.

“Electric power plays a major role in the production process because it generates the intense heat necessary to make the thermal conversion from amorphous carbon to graphite. It changes the physical characteristics of the carbon material to make it ideal as an electrode,” Ulmer explains.

Safety is SDKC's number one goal, says Ulmer. Quality is second. “We believe in maintaining a profitable business and are convinced that the best way to do that and to build financial strength is through working safely to provide consistent, quality products that provide superior value to our customers.”

The capability and quality performance of Showa Denko's production has been independently recognized with receipt of Ford Motor Co.'s Q-1 Award and designation as a registered QS9000 manufacturer. The Showa Denko Carbon



environmental management system is ISO14000 certified.

“The number of pounds of graphite electrode used to produce each ton of steel is the best measure of success in this business,” says Ulmer. “The consumption rate for Showa Denko’s graphite electrodes is about 2 and one-half to 6 and one-half pounds per ton of steel, depending on the customer equipment and practices. The challenge is to make our electrodes so they perform at lower consumption rates than our competitors’ rates, and that’s what keeps us competitive.”



An extruded carbon electrode cools off in a water bath prior to being baked at temperatures up to 800 degrees Centigrade.

Improvements in technology, process and employee efficiency have combined to increase output from 28,000 metric tons per year when the plant started in 1983 to 41,000 metric tons in 2003. The most recent year’s output translates into the ultimate production of about 26 million tons of steel.

This high level of productivity is accomplished with a highly productive workforce of 207 colleagues working a three-shift operation, compared to 155 at the start up in 1983.

Showa Denko K.K., the Ridgeville plant’s parent company, ranks as one of Japan’s leading chemical companies, operating in five major sectors — petrochemicals, chemicals, electronics, inorganic materials and aluminum.

On the Japanese firm’s corporate organization chart, Showa Denko Carbon

is located under the Inorganic Materials Division, which includes ceramics (aluminum hydroxide, alumina, abrasives and refractories), carbons (graphite electrodes) and metallic materials (ferrochromes.) With sales of \$474 million in 2002, Inorganic Materials attributed to 8.4 percent of the company’s total revenue of \$5.6 billion.

SDKC exports 12 to 20 percent of its product, supplying 80 percent or more to the U.S. market. Its largest domestic customer is Nucor Corp.

Ulmer credits colleagues (employees) and what they have done and continue to do as being the uniqueness of SDKC. “The committed efforts of our colleagues have taken our company to a quality leadership position in the industry while expanding our product line from only 24-inch electrodes in 1983 to today’s



A red-hot electrode emerges from the electrically powered graphitizer furnace, which passes 120,000 amps of electricity through the electrodes for up to 20 hours.

products ranging from 18 inches to 30 inches diameter. This has helped us remain profitable in a fiercely competitive marketplace where our competitors have lost money.”

He cites one domestic producer that recently went bankrupt and one major competitor that moved its U.S. production to their plant in Mexico. “In spite of a customer base that has seen over 35 steelmakers go bankrupt or shut down since 1998, our concerted efforts have differentiated our product, enabling us to consistently be in a sold-out position and become the major supplier in the domestic super-size electrode application.”

Ulmer feels strong about the support received from the Dorchester County community where SDKC is located. “As I met people in South Carolina and Dorchester County when we began building this facility in 1982, I developed a confidence that we could become an outstanding company because there were great people here wanting to do a good job. Today, as our colleagues are on track to set a new production record, I feel we have grown into a cohesive, focused organization that can deal with any challenge that may come at us. That’s because our colleagues are committed, conscientious, intelligent, articulate and willing to conquer challenges through open discussion.



Mary Wheat, Finishing Department operator, inspects a completed carbon electrode.



*Dan Pascazio, technical manager for Showa Denko Carbon.*

## Energizing the Community

While being a leading electrode producer for a worldwide market, Showa Denko Carbon is equally effective in being a good corporate neighbor through local community outreach. SDKC is a key contributor and outreach provider to meet the needs of key local initiatives, particularly the Ridgeville Community Resource Center, which it helped establish.

Services available through the center include a community library, computer training and a senior-care program. SDKC has provided financial support for day-to-day operation, donated computers and extended advice and support, says Clint Lucas, Showa Denko Carbon's human resources manager.

In addition, the company sponsors field trips, a month-long summer day camp for children. Each year the firm brings in the Charleston Symphony Orchestra for a concert in conjunction with the Ridgeville Arts and Cultural Committee's three-day Spring Festival.

SDKC is a business partner with Woodlands High School and Harleyville-Ridgeville Elementary School, where employees are active in the Read with a Child program.

Additional support and participation is provided to the Four Holes Indian Reservation. "In all these programs and activities, we're not a high profile industry," says Lucas. "But we take great pride as a company and as employees in working within the community where we live and where we work."

Says Ulmer, "While becoming more global and competitive through our business and personal contacts, SDKC has developed a strong community bond through the outreach and involvement of our colleagues."

Santee Cooper power is delivered to Showa Denko Carbon over a 115 kiloVolt transmission line running from Carnes Crossroads to the Ridgeville site.

"When we made the decision to locate in Ridgeville, we made a good choice, and I've always appreciated working with Santee Cooper people," says Ulmer. "They're quality people who have always listened to us and worked with us in keeping rates reasonable and service reliable."

## The Making of Electrodes...

The production of graphite electrodes is a complex process, explains Dan Pascazio, technical manager for Showa Denko Carbon. "It all begins with a mixture of two hydro-carbon products — calcined petroleum coke, a byproduct of the refining process, and coal tar pitch, a coal byproduct of steelmaking."

The coke and pitch are shipped in by rail, loaded into silos and storage tanks, then combined in a complex process that takes about six weeks — from the time the raw materials are downloaded until the electrodes are packaged ready for shipment.

"Manufacturing electrodes is a continuous 24-hour operation that follows seven distinct steps," explains Pascazio.

- Production begins with the crushing, milling and mixing of premium needle-coke, coal-tar pitch and selected additives.
- The resulting mixture is extruded to form an electrode of the desired diameter and length.
- Extruded rods are placed in large stainless steel canisters (saggers) with a protective covering of sand. The saggers are loaded on railcar platforms and rolled into natural gas-fired kilns to be baked at temperatures up to 800 degrees Centigrade. The baking cycle converts the extruded materials into hard, amorphous carbon. At this step, it is a form of carbon that is brittle, abrasive and difficult to machine.
- Before further processing, the baked carbon rods are impregnated with petroleum pitch to increase density and strength and improve electrical end-product conductivity.
- The pitch-impregnated rods are rebaked in the kilns to transform the added pitch into carbon.
- Conversion of the carbon to graphite is accomplished by heating the rebaked rods to temperatures up to 3,000 degrees Centigrade in

electrically powered furnaces called graphitizers. Here, for 10 to 20 hours, up to 120,000 amps of electricity are passed through the electrodes—lined up end-to-end and covered with coke. The intense heating causes the random structure of the material to change from an amorphous (without crystalline structure) to a graphitic (with crystalline structure) form, which enhances its electrical, thermal and mechanical properties and makes it stronger, more durable and machineable.

- In the final process, the graphitized rods are machined to the required diameter and length in a large numerically controlled lathe. Tapered sockets are also machined in both ends of the electrode. As a convenience, electrodes are usually shipped with a pre-inserted connecting pin.



# ELECTRICAL SAFETY: IT ALL BEGINS WITH YOU

*Before 1897, not one person had ever died in an automobile accident. Of course, any student of history could tell you that there were precious few automobiles around before then. The amenities that technology has bestowed on us are truly marvelous. But with progress comes great responsibility. These advances, such as electricity, bring with them new hazards. To address the dangers, we must become aware of the risks and map out a strategy to either negate or avoid them. In short, you've got to be safe.*

Electrification of the U.S. has probably done more to improve our everyday lives than any other technological advance. The conveniences that electricity has given rise to—illumination, refrigeration, water pumping, space conditioning and home entertainment—to name a few. It's made life easier and safer for all of us. But these advancements came with new risks.

According to the National Fire Protection Association and the U.S. Consumer Product Safety Commission, between 1994 and 1998 there was an average of 406,700 residential fires per year, with approximately 69,000, or 17 percent, related to electrical distribution or appliances and equipment. Another 42,700, or 10.5 percent, were related to heating and air-conditioning systems. These combined to cause an average of 860 deaths, 4,785 injuries and nearly \$1.3 billion in property damage annually.

Additionally, 170 of the 440 total accidental electrocutions in 1999 in the U.S. were related to consumer products in and around the home, and approximately 8,700 people were treated for electric shock injuries related to consumer products in the U.S. in 2000.

**Left:** Training Instructors Claud Wessinger and Bill Wilcox (with hot stick) of Santee Cooper's Power Line Hazards Demonstration Team show the dangers of electricity to a school group.

**Above:** TV ads promoting electrical and water safety provide directions to Santee Cooper's electrical and water safety Web sites.







### Your Home is Your Haven

The Electrical Safety Foundation International provides information that can help you avoid safety hazards and keep your home safe and secure. The organization's home safety materials address such items as conducting an electrical safety audit. "Be electrically safe," is the message delivered by the foundation. They offer an enormous amount of common-sense advice through numerous recommendations, all worth following:

- Never put your finger or anything other than an electrical plug or safety cap in an outlet.
- Limit the number of appliances plugged into each outlet; don't overload your outlets.
- When unplugging an appliance, pull by the plug, not the cord.
- Be alert for damaged plugs and cords and don't touch or use damaged plugs and cords on electrical appliances and fixtures.
- Repair or replace frayed cords and never run cords under rugs or around sharp corners.
- Unplug small electrical appliances and toys when you're not using them.
- Unplug appliances before cleaning or servicing them.
- If an appliance smokes, sparks, shocks you or doesn't seem to be operating normally, stop using it immediately. Have it repaired before attempting to use it again.

### Electrical Safety is Important Outdoors Also

- Many neighborhoods have underground electric lines. If you inadvertently dig into one of them, you could be killed or seriously injured. So, before doing any type of digging in South Carolina, call Palmetto Utility Protection Service (P.U.P.S.) at 1 (888) 721-7877 to have underground utilities located. For more information or to submit an electronic locate ticket (eNotice), visit [www.SC1PUPS.org](http://www.SC1PUPS.org).
- In areas with underground power lines, there is often pad-mounted equipment (green boxes) located along rights of way. This equipment is safe unless damaged. Nevertheless, do not allow children to play on or around these apparatuses. Notify your utility immediately if you suspect that equipment is damaged and stay clear of damaged or open equipment.
- Many homeowners like to plant shrubs to block the view of pad-mounted equipment in their yard. Utility personnel need to have direct access to the equipment in the event of a power outage and to perform maintenance. Special care must be taken to keep your plants a safe distance from this equipment. Santee Cooper asks customers to allow 10 feet of space on the sides with doors and 3 feet of space on the other sides when planting shrubs.

- Many overhead power lines are bare and not insulated. So take care not to come in contact with them when working with ladders, pruning tools, pool skimmers, television antennas, pipes and the like. Also check for overhead power lines before launching a sailboat, raising its mast or moving a trailer-pulled boat with the mast up.
- Never touch a downed power line or anyone who is touching it. Even if there are no sparks, the line could still be live. If you should come upon a downed power line, get help right away and call your utility for assistance. Do not try to move downed power lines with brooms, boards, limbs or the like. Even nonmetallic objects can conduct electricity.
- Don't drive over downed power lines. If you're in an accident and a power line comes down and stays in contact with your car, stay in the car until help arrives. Don't let others approach. If the situation becomes too dangerous for you to stay in the vehicle, jump out on both feet without touching the vehicle and ground at the same time.
- Never climb trees near overhead power lines. Look before you climb any tree to be sure no wires run through or near it. Keep in mind, your weight may cause a branch to sag and touch a wire. Always fly kites, model planes, Mylar balloons and other toys in open spaces, away from power lines, such as fields or parks.

- Use only nonconducting materials for kites, such as plastic, paper, clean-dry wood and string. Never use wire, metal or foil. Don't fly toys in the rain or in a storm. Ben Franklin was a very lucky man to have survived his famous experiment. If a kite or other toy becomes entangled in a power line, call your electric utility to free it.
- Never, never, never climb utility poles or other structures or enter substations. They're surrounded by big fences and "Danger: High Voltage" signs. If a ball or pet gets inside the fence, call your electric utility. They'll come and get it out for you. Remember, even things that look harmless can hurt you.
- Workers who operate a crane, boom or cherry picker need to take extra care when working around power lines. Cranes and other equipment should not be operated any closer than 10 feet of overhead power lines for voltages up to 50 kV and 4 inches away for every 1 kiloVolts over 50 kiloVolts.
- Most power outages are short-lived and do not warrant the use of auxiliary power. However, some homeowners use portable electric generators for this purpose. To ensure personal safety, for those around you and for utility line workers, electric generators should be operated according to strict guidelines. Always follow manufacturer instructions completely. Never connect a portable generator to existing house wiring. Rather, plug the appliances directly into the generator. Refer to the owner's manual for specific instructions on load capacity, approved power cords, etc. Operate generators outside, as they emit harmful fumes and contain combustible fuel. Add fuel to the generator only when it is not running and has had time to sufficiently cool. Always properly ground a generator before operating.
- Don't trim trees near power lines yourself. Call a professional arborist.





## Electricity and water don't mix.

- Don't use electrical appliances when you're wet, have wet hands or are standing in water.
- Keep electrical appliances and toys and their cords away from water, including rain, wet ground, swimming pools, sprinklers and hoses.
- Protect outdoor electrical outlets and indoor outlets near water sources with weatherproof covers and ground fault-circuit interrupters to protect against shock.
- Make sure tools and appliances are approved for outdoor use. They are made with heavier wire, special insulation and three-way grounded plugs.

## Lightning is powerful electricity in the air. Knowing what to do during an electrical storm can help keep you safe.

- Get inside a building, if possible. Keep away from windows and open doors.
- Don't use electrical appliances or the telephone. Lightning can follow the wires into your home.
- Stay out of the shower or bathtub. Lightning can also travel through the pipes.
- Avoid trees, poles and other tall objects. Also avoid large metal objects. These things are also targets for lightning.
- Go to lower ground and crouch down low if you're caught outdoors.
- Stay out of the water and never go swimming or boating during a storm. If you're in the water, get out as quickly as possible.



*Santee Cooper's safety Web site encourages kids to look for areas free of power lines and to use caution when flying kites.*



*The first rule for observing water safety is wearing an approved flotation device.*

## "Play it Safe Around Electricity and Water" are Constant Messages

"With great power comes great responsibility"... Those words of Spiderman's late Uncle Ben ran through his head as he swung his way through the streets of New York City doing good. The same is true with electrical power.

"As South Carolina's largest electric provider, we want the public to know how to use electricity safely," says Phil Fail, Santee Cooper's director of creative and technical services. "So, in 2003 we embarked on a multimedia campaign to educate the public as to some of the potential hazards of using electricity."

The campaign, which began appearing in print and on cable and broadcast television in 2003, started out with two television spots. "There was just too much information to cover in a single 30-second spot," explains Fail. "So we marked the division at the front door and produced two commercials, one focused on electrical safety in the home, and the other on playing it safe outdoors."

The spots, introduced by veteran line technician Curlin Simmons, invite the viewer to visit [www.scsafeguard.com](http://www.scsafeguard.com) and find out more. When the viewer gets to the Web site, they're presented with links to a number of Web pages packed with safety information.

"This isn't our first foray into electrical safety education," explains Barbara Allen, Santee Cooper's director of educational programs. "For decades Santee Cooper has been taking electrical safety messages into classrooms and letting students know that when it comes to danger, they need to stop...think...then act."

Another high power vehicle for delivering the electrical safety message is Santee Cooper's PHAD (Power Line Hazards Awareness Demonstration) unit, headed by Training Instructor Claud Wessinger and staffed by experienced line technicians. The unit is a mobile platform with utility poles, electrical conductors and distribution transformers used to simulate live power. It teaches electrical safety in a realistic and vivid way by demonstrating exactly what happens when animals, trees, tools and equipment, antennas, ladders, or kites come into contact with power lines.

Over the past decade, the PHAD unit has been delivering electrical safety presentations to schools, onto the playgrounds and into civic arenas, informing students, safety, professional and community groups statewide about how they need to respect and understand electricity.

Through their dramatic, high-voltage demonstrations, the linemen demonstrate the power and potential hazards presented by electricity, advising safety in playing and working around power lines, substations and other electrical equipment.

Even leisure may come with a risk. The Santee Cooper Lakes are widely recognized as one of South Carolina's great recreational resources, attracting people from all over the world to enjoy boating, swimming and unmatched fishing. So in the summer, Santee Cooper added messages promoting swimming and boating safety to the campaign. Again, the ads lead to the readers and viewers to visit [www.SCWATERS.com](http://www.SCWATERS.com), Santee Cooper's water safety Web site, where they are linked to information about how to play it safe as well as abundant information about Santee Cooper Country.





# CHILDREN'S MUSEUM OF S.C.

## OFFERS INTERACTIVE LEARNING EXPERIENCE

Dig through the sand to find shells and fossils. Board the USS Kids-Afloat for a boating experience on the open seas. Sit behind the wheel of a Volkswagen Beetle and learn how to drive. Stand in front of an automatic teller machine to deposit and withdraw money. Take an art class and have something to display under a magnet on the refrigerator door.

Think you have to visit five different venues for all of this fun and entertainment? Wrong! These learning experiences, along with numerous others, are housed under one roof at the Children's Museum of South Carolina at 2501 North Kings Highway in Myrtle Beach.



**Left:** "Bubble Mania" is just one of many hands-on learning experiences offered for inquisitive young minds at the Children's Museum of South Carolina. **Above:** Santee Cooper Director of Educational Programs Barbara Allen and Education Assistant Diane Vascovich.





## Touring Today's Museum

Housed in an 8,000 square-foot facility, the children's museum offers interactive learning opportunities for children. The mission of the museum is "to promote and stimulate self-discovery through interactive learning experiences, which will enhance every child's understanding of his or her global community."

Children, ages 2 to 11, are the target audience for the museum. "When the Atlantic Ocean is your main competitor, you have to offer quality programs and activities to bring children to the museum," says Henry Challe, the museum's director of marketing. "I think we're doing that with our exhibits and programs."

As soon as they walk through the front door, children will see rabbits, lizards, frogs and birds that reside in the Discovery Lab. While the children watch the creatures in their habitats, they learn how animals and people need to coexist on earth.

Children visiting the museum can also see just how much power it takes to electrify a city. Santee Cooper's exhibit features a town in miniature, with electric lines, line trucks and a power generator. Youngsters can bring the town to life by hand cranking the external generator. That's the interactive part.

"This exhibit is a wonderful educational opportunity for children of not only the Grand Strand, but the entire state," says Santee Cooper's Director of Educational Programs Barbara Allen.

Allen continues, "We're able to tell several stories with our exhibit at the museum. We can teach both children and adults how electricity is generated and how important it is to be safe around electric lines."

With Ms. Frizzle at the wheel, the Magic School Bus takes students on a field trip through the solar system, a journey inside the human body, and an exploration through the rain forests.



*USS Kids Afloat provides a simulated nautical experience and emphasizes water safety.*

## Planning Tomorrow's New Facility

The children's museum first opened its doors in 1994 in a 1,200-square foot facility at Myrtle Square Mall. Within a year, the museum moved to its current foot facility, located in a building separate from but adjacent to the mall.

Because of the success of the children's museum, even greater space is needed. With the plans for a new facility, the museum's size will increase almost seven times — to 54,000 square feet. The new museum, constructed on just over six acres, will be at the corner of 29th Avenue and Grissom Parkway in Myrtle Beach.



"With Broadway at the Beach in our backyard attracting some 11 million visitors each year, the new museum should become a featured attraction," says Challe. "Research shows that the museum may attract some 450,000 visitors in its first year of operation at the new site."

Burroughs & Chapin Inc., a Grand Strand area land-based development and operating company that has been a supporter of the children's museum since the beginning, helped the museum acquire the property.

"Our museum receives so much support from the community," says Pam Barnhill, executive director of the children's museum. "As we get caught up in the gigantic task of paving the way for the future of the museum, it is easy to forget that it is often the simplest things that touch and impact a child's life. All of our exhibits are a constant delight to children, sparking imagination and growing interest in and a love for learning."

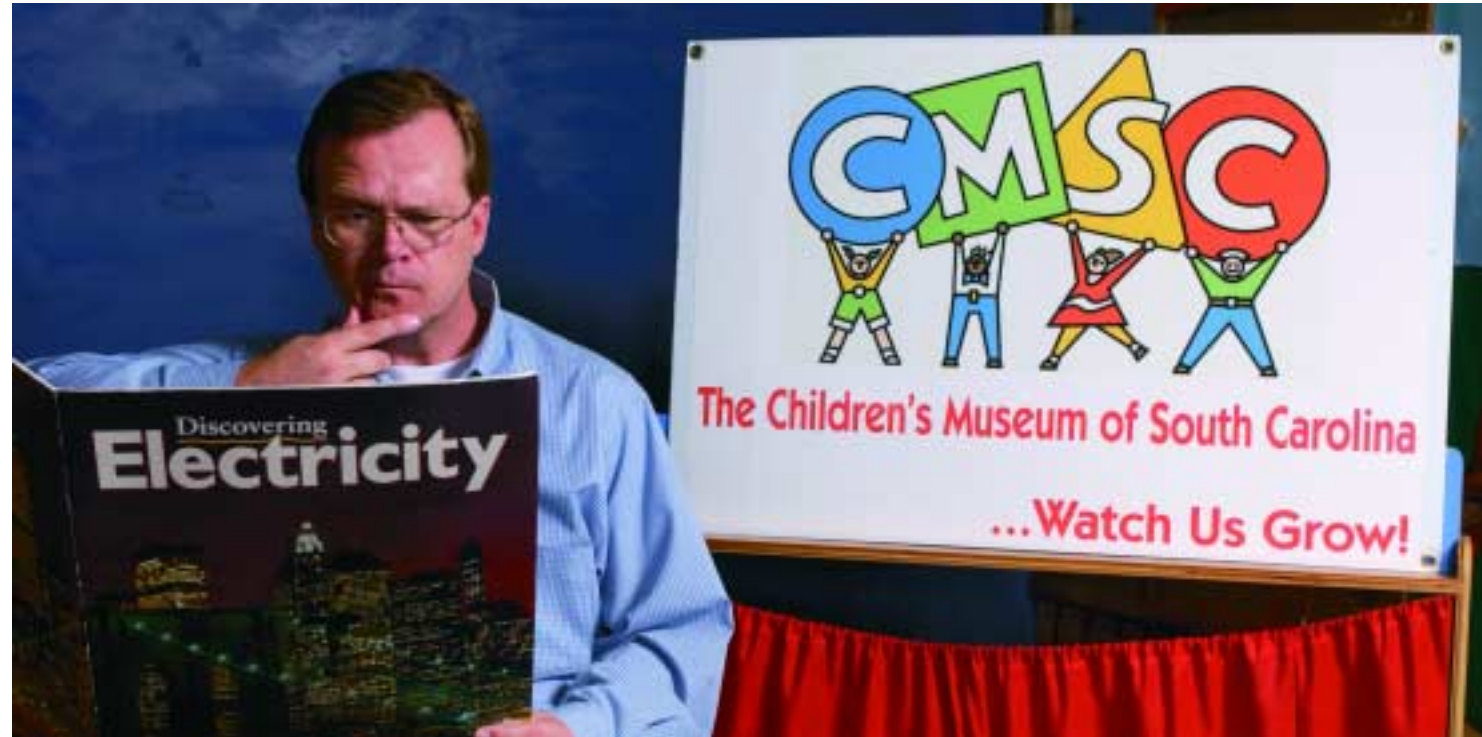
*"It's Electric" is a Santee Cooper exhibit that allows visitors to turn a hand generator to power up a table-top town.*



*Children's Museum Executive Director Pam Barnhill.*



Director of Marketing Henry Challe examines one of museum's resource books on electricity.



In the main exhibit area of the new children's museum, visitors will explore "Kidz City," an interactive stroll down a re-creation of a historic Myrtle Beach city block. Among a medical center, construction site, supermarket and bank, which all give children a glimpse into various careers and industry, is the "Kidz City Media Complex." The media complex will contain a television station and newspaper office that will give children a

chance to take part in news broadcasts and create their own front-page news story.

Because of the new museum's exhibits and programs, it could become one of the top 10 children's museums in the country, according to a landmark survey conducted by Child Magazine.

The survey, which was the first of its kind in the nation, worked with advisers from the Association of Children's

Museums, based in Washington, D.C., to discover just what sets the top institutions apart.

Officials from the children's museum were delighted to discover that details in the plans for the new museum in Myrtle Beach parallel features found in the country's top 10 children's museums.

"We're delighted with the results of this survey," says Barnhill. "Clearly it confirms that we are on the right track

and are building a museum that truly meets what the community and our visitors want from a children's museum."

### Building Children's Museums

Because interactive play teaches, the need for children's museums has long been recognized. The oldest children's museum is the Brooklyn Children's Museum, which opened in 1899. According to the Association of Children's Museums, there were approximately 38 children's museums in the United States in 1975 and 80 new children's museums opened between 1976 and 1990. Since then, an additional 100 have opened, and there are approximately 80 new children's museums in the planning phase.

With the availability of these new facilities, attendance at children's museums has skyrocketed, according to a report in The Washington Post. According to the Post, in 1991, a total of 8 million people visited children's museums nationwide—fewer than

the number who visited the National Air and Space Museum. Just 10 years later, 33 million people went through their doors.

The growth can be traced to the rising number of children in the country, with almost 80 million Americans under the age of 20, according to the report. There is also the push to foster learning from a variety of approaches, the increasing popularity of museums in general and the encouragement of public and private planners who view these repositories as energetic and safe attractions in downtown development.

"Children's museums are the fastest-growing cultural institution in the world," says Janet Rice Elman, the Children's Museum Association's executive director. "That trend will continue as we see more communities wanting to start up a children's museum to enrich civic and family life."

The Children's Museum of South Carolina in Myrtle Beach was the first



Sisters explore Santee Cooper's "Circuit Center," where they make connections that turn on lights and ring bells.



children's museum in the state.

A children's museum opened in Charleston in September 2003 and the Columbia museum, EdVenture, opened in November 2003.

## Reaching into the schools

Not only do children come to the children's museum, but the museum also goes to the children through its outreach programs. Staff members from the museum's educational resource area go into the classroom to provide programs for first through fifth graders. Programs include "Soliquid," "Measuring with Grow Creatures," "Going Up," "Magnet Force Be With You" and "Concentration."

"The more we go into classrooms, the more requests we receive for our outreach programs," says Eddie Lott, director of education and exhibits. "Sometimes it puts a strain on our resources, but we're here to educate. We love doing it."

*Architect's rendering of new 54,000 square-foot museum facility, scheduled for opening in 2005.*

"All of our hands-on science outreach programs are correlated to both National Science Standards and South Carolina Science Standards," says Lott. "Programs are designed to be used as introductions to a unit or as supplemental instruction."

## Helping the Museum

"It just seemed like a natural fit for Santee Cooper to become involved with the Children's Museum of South Carolina," says Santee Cooper Education Assistant Diane Vascovich. "The museum is designed around the community, and Santee Cooper has a large presence and a historical significance in this community. Almost 85 percent of our customers reside in Horry County. Therefore, it was the right thing to do as a good corporate citizen."

The museum is a private, not-for-profit, tax-exempt corporation. It is supported by a combination of private, corporate and public funds, and is governed by a board of directors comprised of local business and community leaders. More information about the museum is available on their Web site at [www.cmsckids.org](http://www.cmsckids.org) or can be received by calling (843) 946-9469.



# CHILDREN'S MUSEUM EXHIBITS

Opportunities for interaction, hands-on experience and discovery abound among the more popular exhibits in the museum. It's a see and do environment, inviting young visitors to role play, emulate and explore.

**Magic School Bus** — Ride along as Ms. Frizzle and her class take you on Magic School Bus field trips to a variety of locations.

**Stuffee** — Learn how the human body works. Follow food as it makes its way through the digestive system as Stuffee is turned inside out.

**Children's Museum Emergency Room** — Role play some of the careers and experiences associated with being a doctor, nurse, X-ray technician or patient.

**Dr. Molar's Dental Office** — Role play using a dental chair, X-ray machine and models of teeth while learning about careers related to dentistry.

**USS Kids Afloat** — Sail the seas and practice water safety as you learn about the boat and simulate the nautical experience.

**Mama Tomato's Pizza Truck** — Hop in, create a pizza, bake it and it's ready to serve. Practice counting while it's heating and even learn about fractions.

**Volkswagen Beetle** — Find out what it's like to drive a car. Experience the driver's perspective in the red Volkswagen Beetle.

**Bubble Mania** — Make bubbles big and small and put yourself inside a giant bubble.

**Discovery Lab** — Explore the natural world while observing some of the plants and animals native to South Carolina.

**Express Yourself Art Center** — Draw, color, glue and create your own masterpiece to take home.

**Forestry** — Explore the nature of a local forest. Identify trees by their leaves and bark and make a leaf rubbing to take home.

**South Carolina Fossil Hunt** — Become an archeologist and dig through the sand as you look through 65 million year old fossils from ocean animals of South Carolina.

**Automatic Teller Machine** — Use your museum bank card to withdraw play money, make deposits and practice your math.

**It's Electric** — An exhibit that allows you to explore the world of electricity. Generate your own power to run a city or build circuits that turn on lights and ring bells.

**Giant Light Brite** — Design your own pictures with multicolored lighted pegs.



# NEWSOURCE

## RAINEY UNITS 3, 4 AND 5 BEGIN COMMERCIAL OPERATION JAN. 1

**Santee Cooper began the new year with 240 megawatts of new generation.**

Three 80-MW natural gas-fired simple cycle combustion turbine units at the Rainey Generating Station, located near the Starr and Iva communities in Anderson County, were placed into commercial operation on Jan. 1, 2004, signaling completion of the \$120 million project.

"Everything looks good with the new units," said Rainey Station Manager Dickie Thorndyke. "They've officially been turned over to us, and Santee Cooper now has over 1,000 megawatts of generating capability here in Anderson County."

The first phase of generation at Rainey, 500 MWs of combined-cycle generation at Unit 1, entered commercial operation on Jan. 1, 2002. Two additional 150-megawatt simple-cycle combustion turbines, Units 2A and 2B, went online in the spring of 2002.

Total output from the generating station is sufficient to meet the electrical needs of more than one-million residential customers. That's enough electricity to serve residents of the 25 largest urban population centers in South Carolina.



# LEST WE FORGET...

## A Glimmer of Hope

The flow of electric power for the first time was a momentous occasion and a reason to celebrate for millions of Americans. Such was the case in the early 1940s as Santee Cooper-generated power was delivered for the first time to customers in Berkeley, Horry and Georgetown counties and to electric cooperative customers spread out across most of South Carolina. In this photo from the archives of The Electric Cooperatives of South Carolina, a teacher shares with her class the marvel of electric light coming from a hanging incandescent fixture. It was a hands-on demonstration of how electric power was illuminating their communities and improving their quality of life.







**“The only way to last  
around electricity is to  
put safety first.”**

Curlin Simmons, Lineperson  
Santee Cooper



*Electricity works wonders. It powers our businesses and our homes. You can't see it. But don't ever forget it's there. In the power lines overhead. In cables buried in the ground. In the plugs in our walls. And it can be very hazardous if you're careless. Visit our special site below for electric safety tips. And while you're there, feel free to explore links to all the other ways Santee Cooper works to make life better for everyone in South Carolina.*

**scsafeguard.com**

Visit [www.scsafeguard.com](http://www.scsafeguard.com) for tips  
on electric safety.

**Santee Cooper** POWER  
Dependable Power. Dependable People.