Metering Technology Reflects Industry Changes
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Bulk power. High voltage and distribution voltage. Transmission transformers. Voltage x current = power (in watts).

The electric power industry is obviously one that relies on technology and precision. Equipment, design and planning have advanced significantly over the years.

Measuring the exact amounts of wholesale bulk power that South Mississippi Electric provides to its Members at more than 185 metered delivery points on SME's on- and off-system requires equipment as sophisticated and modern as any in the system. (Billing information from the borderline system is provided by Mississippi Power). It is not like metering the end use of our product at a customer's house.

The meters used by South Mississippi Electric measure two dynamics of power delivery. The overall amount of power is measured over an hour time period and is called a kilowatt hour (kWh). The amount of demand, which rises and falls throughout the day, is measured over a 15- or 60-minute time period and is called a kilowatt (kW). Knowing the peak demand at each substation is important because it is what determines SME's overall system demand, or how much generation is needed to meet the combined system peak.

If you think about electricity flowing along lines similar to the way water flows through a pipe, it is necessary to measure the current (flow amount) and voltage (pressure) to determine the amount of power transferred through each substation. Because the voltage and current levels are so high, the metering process uses highly accurate equipment to reduce them to measurable levels—information the meter then uses to calculate the delivered power. The meter also takes the real time data and determines the average and peak demand for every fifteen-minute interval.

South Mississippi Electric's metering process has seen constant changes over the years, due not only to technological advances but also to increased power demand. Boby Spiers, meter and substation inspection supervisor, has worked for SME for 29 years and has seen a number of those changes.

"Being able to correctly measure power flow and sales is an important part of what we do as a power supplier," said Spiers. "We constantly try to improve our performance by keeping track of the latest technology, as well as through our knowledge of the process.

"Our jobs are also about building relationships with our Members, and I believe we have earned a reputation for providing outstanding service for our members. We work together—that is the nature of being a cooperative."

One of the more recent technological changes in the process is using wireless cell phone systems to gather data from each of the substation meters. The system was also upgraded from analog to full

digital cell technology during the past two years as cellular providers moved away from their analog equipment. According to Spiers, however, that is not the only change.

“For many years, electro-mechanical meters were installed with magnetic tape recorders and a clock to record the amount of energy passing through a substation,” he said. At the first of the month, meter technicians, along with other South Mississippi Electric employees, gathered the tapes from each location and brought them to Headquarters so they could be read to determine billing data. Checking the reading only once a month sometimes meant that it was hard to catch any problems that might develop.

“Now, the meters collect real-time data that is sent regularly throughout the month to our computers. Being able to know quickly if there is any problem with the collection and transfer of information is a significant improvement. ”

Kerrie Owen, billing specialist, is responsible for preparing Member billing statements for the amount of energy used during a month. Substation meter readings are compiled weekly and confirmed at the end of each month in order to determine overall usage and the highest peak demand used during 15- and 60-minute periods. Each cooperative is billed monthly for the bulk power delivered through its substations. Bills are sent electronically by the 5th of each month, and payments are received by the 20th.

Metering engineer Travis Brignac designs meter installations at the substations, which includes sizing instrument transformers, programming the meters and configuring the method of meter communication. Although data is recorded in fifteen-minute intervals for billing purposes, Brignac can retrieve data for any specific time, if needed. He can call the meters from his computer to see exactly what is happening at each substation, minute to minute.

To ensure that metered data is as accurate as possible, the instrument transformers that scale the energy flow are sized based on average and peak demands. Every year, peak load data from each of the instrument transformers is analyzed to ensure that their ratings are not exceeded. When an instrument transformer’s ratings are no longer sufficient for a substation’s demand, SME’s meter technicians will change them out, thus ensuring their accuracy.

The meter technicians also regularly make sure that the readings measured at the substation are consistent with the data retrieved from the meters. On regularly scheduled visits to each substation, the technicians collect data measured by the meters to compare with the electronic data sent through the digital cell phones to Brignac’s computer.

“It is a true specialty,” said Brignac of the metering department’s job. “The process consists of continually checking and double checking the data in order to meet our mission of providing outstanding service to our Members.”

Brignac, Owen and the entire metering department continually monitor the process in order to ensure consistent readings. Because the flow of electricity is constantly recorded, data from a specific time can be reviewed in the event of an inconsistent or questionable reading. The intricacies of the meters guarantee accurate readings, which are necessary for billing the Members each month.

“The flexibility of these meters allows us to be the effective energy provider that we are,” said Brignac.