

## **SECOND INTERCONNECTION WITH ENTERGY MISSISSIPPI TO BE COMPLETED SOON**

*Scanner Magazine – May, 2011*

South Mississippi Electric occupies a unique geographic location, with a service territory surrounded by four major utilities: Southern Company, Entergy, TVA, and PowerSouth. As the Association has evolved over the years, new generation resources have been developed to help meet the needs of Member systems but, overall, SME still purchases more than half of the wholesale power required to serve the combined systems' cumulative load.

For South Mississippi Electric and most other utilities, purchasing bulk power from resources throughout the region and importing it through transmission grid interconnections is essential to providing reliable and economical wholesale power. SME's system planning group is continually focused on managing this process by projecting many years into the future how the system will grow and recommending system improvements necessary to maintain adequate power import and power export capabilities.

"We perform long-range transmission planning studies based on the annual power requirements study load projections and recommend system improvements based on our findings," said Alan Wilson, system planning manager. "We also conduct annual studies to look for operational concerns associated with power transfer requirements."

The recommended system improvements are compiled in five-year transmission construction work plans (TCWP). The most recent TCWP, developed in 2008, recommended several major projects which included increasing the transfer capability with Southern Company at the Purvis Bulk intertie and with PowerSouth at Waynesboro; adding an additional interconnection with Entergy Mississippi (EMI) at the Silver Creek Generating Station (Silver Creek GT); and increasing the generating capacity at Plant Moselle.

"The Magee substation is currently SMEPA's only interconnection with Entergy Mississippi," Wilson noted. "It is critical to serving load within the Entergy system as well as throughout our on-system. When the 2009 tornado struck very close to the facility, we were reminded how damaging it would be to our operations to lose that interconnection."

Currently, the three 83-megawatt combustion-turbines at Silver Creek GT feed directly into Entergy's system. This facility is located approximately 12 miles west of SME's 161kV Line 168A, which runs north and south from Mississippi Hub to Columbia and passes close to Southern Pine EPA's Lone Star substation. The new interconnection with EMI will be created by constructing a 161kV line from Silver Creek GT and tapping into Line 168A with the new Southwest Lone Star 161kV switching station.

"Not only will the project provide a second intertie with Entergy, but it will help with transmission voltage support in and around the Silver Creek area of the system, which includes the Georgia Pacific paper mill at Monticello and Southern Pine EPA's Monticello delivery point," said Wilson.

The planned path of the new 161kV line also allows SME to construct a new 161/69kV substation at Prentiss and takes the place of a 69kV transmission line from Prentiss to Lone Star recommended in the 2002 Long Range Transmission Planning Study.

Overall, the new Silver Creek interconnection is made up of five separate projects: the Silver Creek GT 161kV addition, the Prentiss 161/69kV substation, the Southwest Lone Star 161kV

switching station, the 161kV Line 178 (Silver Creek to Prentiss), and the 161kV Line 179 (Prentiss to SW Lone Star).

Designing two relatively short lines presented new challenges for the transmission design group, as Line 179 from Prentiss to the new Southwest Lone Star station was designed to carry two circuits. Building Line 179 with double circuit capacity will help with future reliability by permitting a 69kV line to be added later when needed.

“In order to accommodate the added weight and wind load of a second circuit on Line 179, we had to use much larger structures,” said Jeremy McAndrew, design engineer. “The average concrete pole for Line 179 is about 95 feet tall and weighs approximately 30,000 pounds, with one pole being 115 feet tall and weighing roughly 40,000 pounds. For Line 179, spans between structures were limited to around 550 feet where possible. This is in contrast to Line 178 where the average pole is 80 feet tall, weighs 20,000 pounds and spans were more in the mid-700 feet range.

“We also had a geotechnical investigation conducted by a firm from Mobile, Alabama (GET-Geotechnical Engineering Testing, Inc). Prior to the geotechnical investigation, preliminary line design and site visits helped us to pinpoint areas where soil conditions could possibly be of concern, whether this be because of a higher loaded structure or from low lying wet terrain. From this, fifteen soil borings were conducted along the six-mile line route in order to determine strengths of the soils.

“We know the concrete poles can be designed to withstand the higher loading that comes with the extra circuit, but once the pole is socketed in the ground, the question is whether or not the soil will be able to resist that force and keep the pole from leaning or falling over. Standard embedment of our poles is usually ten percent of the pole’s height plus two feet. Through analysis of the soil strengths along the line route, it was determined that a majority of the structure locations’ soils could not resist these forces without being embedded deeper in the ground. For Line 179, the embedment depth was changed to ten percent of the pole height plus six and a half feet.”

Matt Tillman, substation design engineer, began his work designing the Silver Creek 161kV addition and the Southwest Lone Star switching station early last year. “Anytime you add on to an existing station you see what foresight for future expansion was included in the design,” said Tillman. “The possibility of connecting the Silver Creek generators back to our system was considered even before this station was constructed in 2002.

“The existing Silver Creek GT 115kV switchyard was laid out on a 161kV basis in order to accommodate future 161kV expansion of this station. Constructing a new 161kV breaker and half bay at Silver Creek provides the termination point for Line 178 and the termination point for an additional generator. Ultimately SMEPA owns enough property at Silver Creek to construct three additional generators, one additional 115kV line and two additional 161kV lines, if we ever need to do so.”

The Silver Creek GT 161kV addition also utilizes two 150 MVA transformers that were relocated from Magee during the Magee 161/115kV transformer replacement. When that project was completed in 2007, it more than doubled the existing transfer capability between SME and EMI.

Site development construction for the 161kV addition was completed last September. Subsurface construction, which included foundations, conduit, grounding, rock surfacing and

fencing, was completed in February. Overhead construction, which includes erecting steel, installing bus work, breakers, switches and transformers, was completed in April. The final aspects of bringing the new addition online includes commissioning of the breakers, transformers, RTUs and relay equipment, which will be completed by SME and contract personnel with a projected station in-service date of May 31.

Design work for the Lone Star switching station began in January 2010, as did final site acquisition. As with all new substations or switching stations, approval for the project had to be received from RUS (for financing purposes), and all environmental permits were secured. Once the design was complete and approved by RUS, materials were ordered and contracts for construction were awarded. Construction of the switching station began in July 2010 and continued through early spring. SME's line crews completed the cut in from Line 168A in April.

Lines 178 and 179 were substantially completed by contractors before the end of 2010, and termination of the line at Silver Creek GT is scheduled for the last week of May.

Site development for the new Prentiss 161/69kV substation has been completed and subsurface construction is scheduled to begin this summer. "The site development process for Prentiss was more challenging than usual," Tillman said. "There was a five-acre disturbed area limit; the station drive, which is 567 feet long, drops 38 feet in elevation from the entrance at Highway 13; two major underground utilities needed to be relocated; and the site location required coordination with Southern Pine EPA to accommodate their new substation."

"The wide range of planning, design, procurement and construction associated with this project reflects the complexity of what is required for our system to grow and serve the needs of our Members," said Terry Lee, chief engineering officer. "We currently have seven Member delivery points in the pipeline, three other major transmission improvement projects with completion dates this year, as well as the microwave network expansion, which continues into 2013—probably as many major projects as we have ever had underway at any one time since the late 1960s. It takes a lot of hard work from our entire staff to complete these projects successfully, and I am very proud of their efforts and teamwork."