

Transmission towers flattened by

EF4 tornado

By Erin Huntimer

One of 11 transmission towers lies in ruins, its five-inch angle steel snapped from its concrete foundation.

They've withstood the worst Mother Nature could muster over the past 26 years, but on May 22, 11 steel transmission towers finally met their match. Though strong enough to hold six bundled conductors each weighing 2.5 pounds per foot, they crumpled under the force of an EF4 tornado with winds between 166 and 200 mph.

The damage occurred over a three-mile stretch of line north of Bowdle, SD: nine towers were flattened, one was broken in half, and one was completely gone.

The 345-kilovolt transmission line carries electricity from Basin Electric's Antelope Valley Station near Beulah, ND, to the Broadland substation near Huron, SD. The tornado damage lies between two sections of the same line that were damaged in the January ice storm.

Bryan Keller, Basin Electric manager of Transmission System Maintenance (TSM), says crews from TSM's eight outposts in four states were called in to assist with the recovery efforts. "We had materials on hand to rebuild nine of the 11 structures. The other two are specialized structures that we replaced with temporary structures until we can rebuild them next spring," he says.

Crews finished setting structures on June 9 and stringing conductor on June 18. The line was placed back into service on June 20. He estimates repairs will cost approximately \$1.5 million.

"I have to take my hat off to the crews and supervisors for safely restoring the line in record time. They worked 12-plus-hour

days for 20 days straight to mobilize, assemble and set the structures. After a short weekend back home, they were back pulling in new conductor and

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returning the line to service," Keller says. "With this already being the third major storm-related outage this year, we are all hoping for a quiet summer."

Keller says one of their biggest challenges was dealing with the muddy conditions. "What wasn't already standing wetlands was saturated because of the spring runoff and precipitation," he says.

Crews used three mobile cranes to erect new structures. Deploying the cranes in soggy conditions required some innovative thinking by the TSM crews. "Our big Grove crane weighs

about 95,000 pounds with the counterweights in place. They built a skid, parked the crane on it, and used two Caterpillar dozers to drag the crane into place.”

The tornado ripped some of the towers off their concrete footings; all but one were able to be re-used. “Most of the footings are 30 to 42 inches in diameter and 16 to 18 feet deep. The tornado pulled one about three feet out of the ground,” he says.

Keller says despite the loss of the major transmission line, Basin Electric did not have to reduce generation from its baseload power plants. “Antelope Valley Station Unit 2 was already off line for a maintenance outage when the tornado damage occurred. It also helps that we weren’t in the heating season, and air conditioning loads hadn’t really picked up yet,” he says.

The last time Basin Electric’s transmission system sustained this kind of damage was in 1977 when multiple tornadoes damaged 15 structures along the Leland Olds Station-to-Groton, SD, line.

The May 22 tornadoes and severe weather also caused damage at FEM Electric Association of Ipswich and Cam Wal Electric of Selby, according to the South Dakota Rural Electric Association. Cam Wal Electric lost six three-phase poles in eastern Campbell County.

FEM Electric had 110 poles downed in Edmunds and McPherson counties. The cooperative’s system also had wires pulled off the poles – but the poles were left standing – in a newly constructed four-mile stretch of line.

Scott Moore, FEM Electric general manager, says about 830 members were without power following the storm. “Crews were dispatched around 6:30 p.m. Saturday and worked throughout the night with additional crews arriving Sunday morning from Oahe Electric, Northern Electric, Dakota Energy, and Lake Region,” he says.

Moore says the substations were back on by Sunday. All but two members had power restored by Sunday night, the remaining two by the next morning.



Paul Taylor (in boat) and Vince Smith work to pull a rope across a 1,200-foot wide body of water. The rope is used to pull strawline between two towers on either side of the water. Strawline is cable used to help string and tension conductor.



TSM crews assemble the towers in sections and lift them into place.



(From left) Jon Sherwood, Jay Ritter, Shane Homan and Paul Taylor secure the conductor so repairs can begin.



Overcoming the muddy terrain took some slick thinking by TSM crews. They used two bulldozers and a skid plate to pull equipment like this digger derrick truck into place.

On the web ...

- At www.basinelectric.com, see more photos in the photo gallery and a video titled “Tornado destroys transmission in South Dakota” in the video gallery.
- On The Flip Side blog at basinelectric.wordpress.com, see several posts between May 24 and May 27. Also, see how crews moved the big crane in the June 22 post titled “Slick thinking.”