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# AEP chooses advanced conductor technology for major Texas transmission project

By Steve Muller

The AEP Texas utility unit of American Electric Power Co. Inc. has selected the "aluminum conductor composite core," or ACCC, transmission conductor technology for a 240-mile, 345-kV reconductoring project in south Texas.

This is the largest project globally to use the ACCC technology, developed by CTC Global Corp. It is one of several high-temperature, low-sag, or HTLS, technologies developed over the past decade.

The ACCC conductor uses a core made of a composite of carbon fiber and glass fiber, as opposed to the steel core of the standard aluminum conductor steel reinforced, or ACSR, conductor.

CTC Global says the composite core is lighter and does not sag as much as ACSR under the high temperatures experienced when transmission lines are at maximum capacity.

The ACCC conductor can carry twice the capacity of an ACSR conductor of the same diameter. It also has line losses that are as much as 40% less.

The stiffer core and resistance to sag mean that clearances between a transmission line and vegetation in the right of way can be closer. In addition, the stiffness allows ACCC conductors to span greater distances between transmission structures. This can reduce the number of structures needed and permits the ACCC conductor to span a river or other obstacle.

Finally, a major advantage of the ACCC conductor is that it allows a utility to reconductor to significantly increase capacity within the same right of way while using existing transmission support structures.

"AEP chose the advanced ACCC conductor … manufactured by CTC Global … because of its high load capacity, strength and resistance to corrosion," James Berger, AEP managing director of transmission projects, said in an internal AEP publication. "The well-tested product can replace the existing line without widening clearances or causing tower modifications or rebuilds."

This is not AEP's first use of ACCC conductors. CTC Global Technology Director Dave Bryant

said AEP has completed eight other ACCC projects, although the largest was only about 20 miles.

He said that experience has given AEP a "pretty high level of comfort with the technology's capabilities and its overall benefits."

Because the new lines are double-circuit and have a double-bundled configuration, CTC Global is supplying more than 1,600 miles of ACCC conductor, even though the two lines being reconductored total only 240 miles. CTC announced the signing of a contract with AEP in August.

Both lines start in Corpus Christi, Texas. One line runs to Edinburg and the other to Harlingen. AEP said the new lines will increase power delivery and improve reliability in the Rio Grande Valley area of southern Texas.

The reconductoring work will be done while existing lines remain energized.

**Technology acceptance**

"I'm not surprised that utilities have not moved to adopt HTLS in a bigger way because utilities are conservative," said John Chan, a program manager for the Electric Power Research Institute.

He said he believes AEP's use of ACCC for a major project may give the technology a "stamp of approval" that will encourage other U.S. utilities to take a serious look at it.

Bryant agreed that utilities tend to be conservative, but he said he is pleased that a number of utilities internationally have done substantial technical due diligence on the technology and have developed a level of comfort with it.

"They choose [ACCC] because it gives them the best economic performance, compared to other solutions they looked at for particular projects," Bryant said.

Chan said his research into HTLS technology a few years ago indicated that the ACCC conductor is about three times as expensive as an ACSR conductor of the same diameter. This does not include factors such as increased capacity, lower line losses and ability to use existing transmission structures.

Bryant said costs have come down recently. CTC Global's business model is to produce only the composite core, which is then sent to approved partners for stranding with aluminum wire. Bryant said there are now enough stranding partners that competition has driven down the price of completed ACCC conductor somewhat.

Another issue Chan mentioned is that while the composite core is very resistant to thermal loads, early versions experienced some stretching under mechanical loads such as heavy icing.

Bryant said the coefficient of thermal expansion for the composite core is about an order of magnitude better than for the steel core in the ACSR conductor, so thermal expansion is not an

issue.

He acknowledged that heavy ice loads caused early ACCC conductors to stretch. He said CTC Global has since developed a series of ultra-low-sag conductors to mitigate stretching under heavy ice conditions.

"I'm very pleased that AEP's level of comfort with the [ACCC] technology has expanded to the point where they're doing larger projects now, but we're [also] very pleased that so many international utilities have taken an interest in the technology to solve some of their more challenging situations," Bryant said.

CTC Global said it has completed about 225 ACCC projects in 20 countries.

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