

TECHNOLOGY DEVELOPMENT PROJECT FACT SHEET

UT004: High-Temperature, Low-Sag (HTLS) Conductor

The majority of overhead transmission lines currently use steel-reinforced aluminum conductors (ACSR). ACSR can be operated at temperatures up to 212 °F and, during emergencies, at temperatures as high as 302 °F with some reduction in conductor strength. The Technology Development group, along with T&D Engineering Standards is participating in a project with the

Electric Power Research Institute to evaluate the performance of a CTC ACCC (Aluminum Conductor Composite Core) conductor capable of significantly increasing the current-carrying capacity of thermally constrained transmission lines without the need for extensive tower modifications.

The APS Gavilan Substation was selected for the demonstration of the CTC composite-cored cable. The Gavilan sub is located in the extreme northern part of Phoenix. Four spans of ACCC Drake size cable were installed. The lengths were 1 of 171 feet and 3 each of 262 feet. The 3 phase line voltage is at 69kV. A sensor recording system was installed nearby to provide weather data for the demonstration period. EPRI has performed several performance checks including infrared, ultraviolet and both electric and magnetic field profile readings from the ground. The project is providing APS with information on the operational performance of the new conductor through approximately three years of field trial experience and laboratory tests to evaluate conductor performance and to simulate material aging. APS is gaining experience in the design of the test line, handling of the HTLS conductor, and stringing of the conductor and associated hardware. To identify operating and maintenance issues, the HTLS conductors are being monitored for conductor behavior (measured sag and tension versus manufacturers' data), conductor temperature, and electrical and mechanical performance.

In addition, the project is evaluating the performance of conductor fittings--including splices and dead-ends--in both field and laboratory tests. In all, the results will position APS as an informed buyer and user of the technology.

