



## Lightning Eliminators Provides More Secure Solutions for EPB Substations



Energy • Communications • Community

**Solution: Dissipation Array® System (DAS)**  
**Subject: Power Generation/Smart Grid**



Lightning protection solutions perform an important job in the utilities industry, helping energy companies avoid the downtime and restoration costs that come with outages. But sometimes, the initial choice of a lightning protection solution can become the problem when outside or unknown influences are factored in.

Publicly owned electricity power distributor EPB found this to be the case with the substations it protected first using overhead grounding wires. The utility, which serves 170,000 customers in Chattanooga and surrounding areas, had a few incidents where ground wires meant to prevent service disruptions from lightning actually caused them.

“We had a couple of instances where the overhead ground wires fell on substations and caused outages,” said Mark Wesson, EPB’s manager of distribution standards and design. “As an alternative to overhead ground wire, we started using Dissipation Array Systems from Lightning Eliminators in the late 1990s.”

Like many utilities, EPB knows that leaving substations without some manner of lightning protection is not worth the risk. Lightning protection is part of EPB’s specifications for substations, but high winds and other inclement weather incidents would knock the overhead ground wires down; disabling the substation in events where lightning was not even an issue. They needed a more customized approach and solution which is what [Lightning Eliminators & Consultants, Inc.](#) (LEC), was able to provide.

EPB installed LEC’s [Dissipation Array® System](#) (DAS®) for its new substation construction and for ongoing substation renovations. Each DAS is mounted to a pole adjacent to a substation, and they have proven to be durable, effective solutions that don’t put the substations they are protecting at further risk.



The DAS also uses a different, innovative, method of operation compared to grounding wires. While grounding wires are meant to re-direct an incoming lightning strike’s energy to the ground, away from substation equipment, the damaging secondary effects of the strike are still experienced. The DAS uses “charge transfer” technology, which prevents the termination of lightning within a protected area altogether. The technology is so effective, the DAS has a 99.87% success rate and is the only lightning protection product to offer a full no-strike warranty.

Ensuring maximum power quality, power reliability and asset protection was important to EPB as it sought to upgrade from overhead ground wires. The utility’s solution – the DAS charge transfer technology - is the only type of system where the lightning impulse is not encouraged, but discouraged. The DAS completely isolates facilities from a direct lightning strike by bleeding off the induced charge on the protected area during the course of a thunderstorm, reducing it to a much lower level in relationship to the surrounding

environment. This suppresses the formation of an upward rising streamer, one of the required elements of the strike process, thus avoiding the strike.

Discouraging lightning ended up being a significant benefit to EPB, because providing constant and continual quality power to its customer base is critical: Even one lightning strike to a substation could have a devastating effect. When utilities are faced with a lightning strike to an electrical substation, they are exposed to a multitude of risks. The loss of electrical power to even a small portion of the company's service network would result in lost revenues and customer reliability concerns. Hardware failures can include lost electronics, lost site communication and, in a catastrophic failure, the loss of high voltage power transformers.



### **LEC and charge transfer technology**

LEC helps EPB and many other utilities avoid lightning damage and service disruptions by providing integrated, industrial lightning protection and prevention solutions, products and services. LEC provides innovative, patented charge transfer technology, grounding systems testing, surge protection, design and comprehensive consulting resources, based on physics combined with state-of-the-art engineering principles. To date, the company has installed over 3000 lightning protection solutions in over 69 countries and throughout the United States.

Roy B. Carpenter, Jr., a former chief engineer for NASA's Apollo Moon Landing Missions and the Space Shuttle design engineering teams, founded LEC in 1971 to study and apply engineering principles to lightning protection. This unique form of the charge transfer process - the patented technology used in the LEC DAS solution - reduces the rapid transfer of electrons that occurs with lightning to a slow pre-strike drip by dissipating storm-induced electric charge in the atmosphere above a protected site and lowering the electric field within the envelope of protection. With more than 40 years of lightning protection success, LEC is able to issue a full no-strike warranty to each of its DAS customers, as long as proper installation and maintenance are observed.