



## Bringing Reliable Power to Allentown, PA

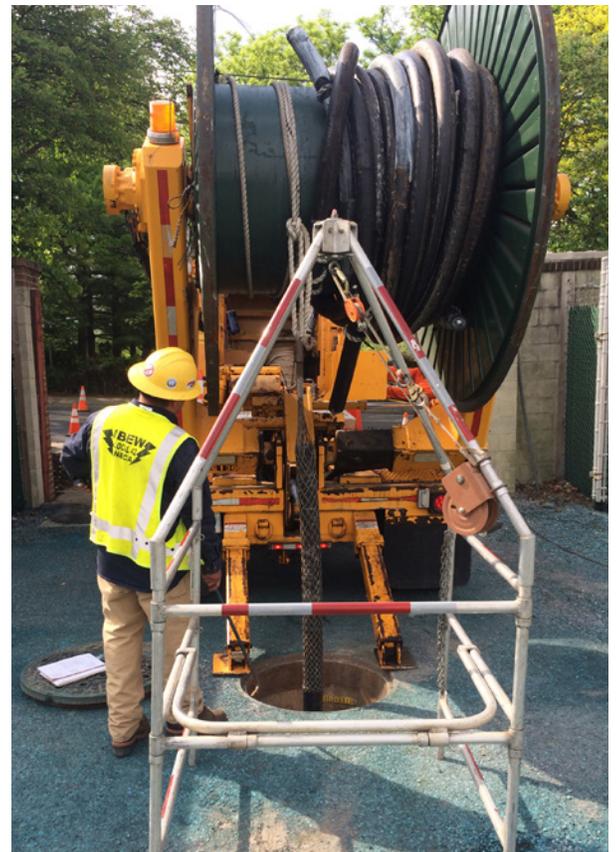
Circuit replacement on busy city streets completed one month faster than anticipated; safety of pedestrians and crews ensured.

In late March 2015, the backup to a main circuit feeding power to some 18,000 residents of Allentown, Pennsylvania, failed. The failure in the redundant circuit, which happened beneath the busy streets of the city, needed an expeditious long-term solution. Failure of the main feed powering the congested 20-block area could leave tens of thousands of residents and businesses in the dark for an extended time.

The failure was found in one phase of a vintage 1971 Phelps Dodge XLPE cable that extended 7,400 linear feet from the city's Sumner Substation to the Central Allentown Substation. Because of its age and condition, the nearly 45-year-old cable was deemed unreliable, and the entire span needed to be replaced to ensure long-term reliability. The local utility wanted the new backup circuit online for the July 4th holiday to ensure the utility could effectively handle peak summer load requirements.

For this large, complex and time-sensitive project, the utility turned to Kerite to coordinate removal of the existing backup circuit and installation of three phases of replacement cable. A total of 22,230 linear feet of vintage cable was removed over a 1.4-mile area and replaced with 138 kV Kerite cable in six phases.

Kerite began to remove the failed cable on May 14. Before the existing circuit could be removed, an asbestos abatement crew entered each of the six manholes on the route to remove asbestos tape used to cover the splices on each phase. To safely access each manhole, the Kerite team closed sidewalks to pedestrian traffic, rerouting foot traffic to the opposite side of the street. Traffic management required several barricades, special signage and the assistance of a traffic control crew.



Once the Phelps Dodge cable was cleared away, the Kerite team systematically pulled each phase of 1500 KCMIL (91) CU, 138 kV SPS 850 MIL Kerite EPR cable that connected the two substations. Each phase of the cable, measuring 3.72 inches in diameter, was spliced to the next phase inside the manhole. Each splice required 10 to 12 man-hours from the Kerite team. Kerite workers also installed 15 PMJ 138 kV joints from G&W Electric and installed a 96-strand fiber optic cable for future telecom use. Once the new cable was in place, Kerite pulled out the old XLPE cable for each phase.

Since dirt and debris can compromise the long-term reliability of a splice, Kerite had to keep the work area and the new cable clean and uncontaminated. Moisture can also jeopardize critical electrical connections at 138 kV, so the air in the work area needed to be humidity-free — a challenge during hot summer months.

To ensure ideal working conditions for splicing and installation in each manhole, Kerite covered the floors with protective poly panels that separated the work area from any existing contaminants on the floor of the manhole and created a pristine environment for splicing operations by installing temporary air conditioning units and gas monitors that fed into the manholes. This allowed the team to control the extreme heat and humidity in the tiny underground spaces and helped ensure the long-term effectiveness of the connections.

While the Kerite team removed and replaced the 18 sections of old cable and worked inside the six affected manholes, a separate contractor worked at the Sumner Substation to hydro-excavate a 70-foot section of direct-buried, damaged cable. Once the old XLPE cable was removed, the contractor installed a new concrete-encased duct bank in the same location where the old cable had been. Kerite then pulled the new cable through the new concrete duct bank. Installation of the concrete duct bank was critical since the Sumner Substation was highly congested, with no real estate available for new cable installations.

Above ground at both the Sumner and Central Allentown substations, Kerite installed six new Raychem terminations, three in each location.

The Allentown power restoration project took just six weeks — one month less than the utility had originally anticipated. “Circuit failure in a city can affect thousands of people and cost hundreds of thousands of dollars,” explains Ian Stangle, Kerite project engineer. “Kerite delivered a plan and executed a logistically safe solution for the utility in less than two months. Our crews worked tirelessly and efficiently, making sure this complex installation went smoothly and will operate reliably for many years to come.”

